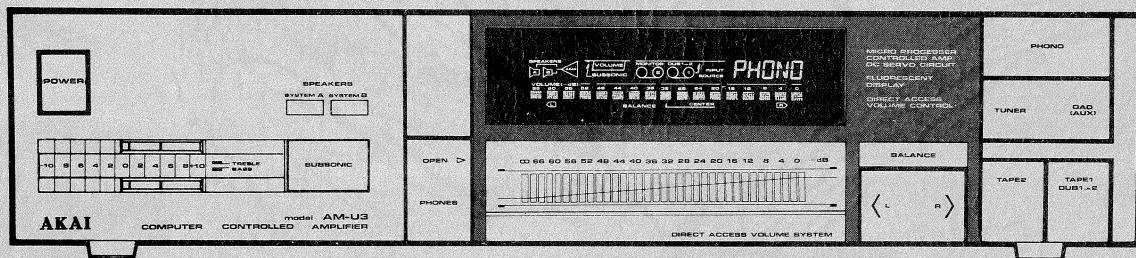


AKAI SERVICE MANUAL



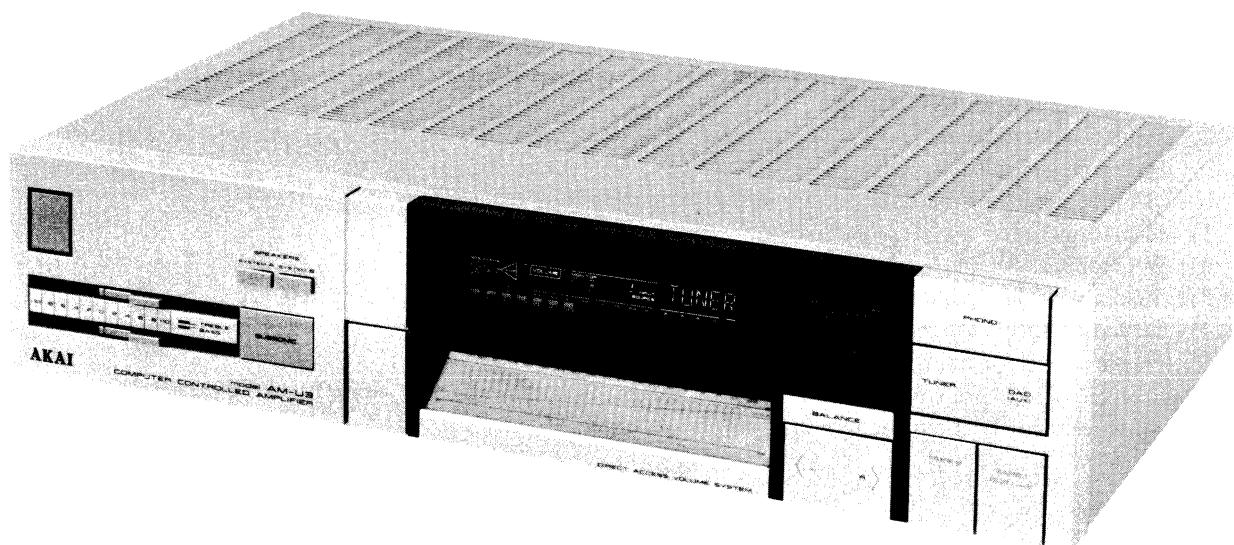
COMPUTER CONTROLLED AMPLIFIER

MODEL **AM-U3**

ABBREVIATIONS FOR SERVICE MANUAL

MODEL AM-U3

ABBREVIATION	EXPLANATION
AC	Alternating Current
SEG	SEGment
A	Analogue
D	Digital
FLD	FLuorescent Display
SW	SWitch
R	Right
L	Left
S	Serial
P	Parallel
EQ	EQualizer
OSC	OSCillator



COMPUTER CONTROLLED AMPLIFIER

MODEL AM-U3

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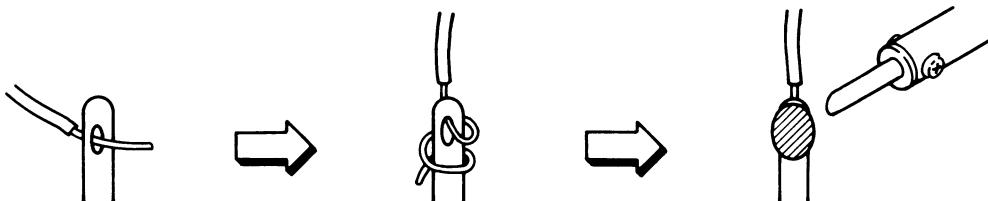
SAFETY INSTRUCTIONS

SAFETY CHECK AFTER SERVICING

Confirm the specified insulation resistance between power cord plug prongs and externally exposed parts of the set is greater than 10 Mohms, but for equipment with external antenna terminals (tuner, receiver, etc.) and is intended for **C** or **A**, specified insulation resistance should be more than 2.2 Mohms (ground terminals, microphone jacks, headphone jacks, line-in-out jacks etc.)

PRECAUTIONS DURING SERVICING

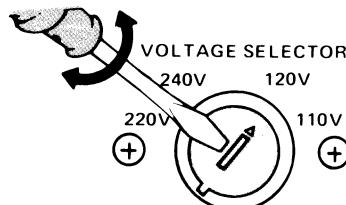
1. Parts identified by the Δ symbol parts are critical for safety. Replace only with parts number specified.
2. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements. Examples: RF converters, tuner units, antenna selector switches, RF cables, noise blocking capacitors, noise blocking filters, etc.
3. Use specified internal wiring. Note especially:
 - 1) Wires covered with PVC tubing
 - 2) Double insulated wires
 - 3) High voltage leads
4. Use specified insulating materials for hazardous live parts. Note especially:
 - 1) Insulation Tape
 - 2) PVC tubing
 - 3) Spacers (Insulating Barriers)
 - 4) Insulation sheets for transistors
 - 5) Plastic screws for fixing microswitch (especially in turntable)
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



6. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).
7. Check that replaced wires do not contact sharp edged or pointed parts.
8. Also check areas surrounding repaired locations.
9. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.
10. Voltage Conversion

Models for Canada, USA, Europe, UK, and Australia are not equipped with this facility. Each machine is preset at the factory according to destination, but some machines can be set to 110V, 120V, 220V or 240V as required. If your machine's voltage can be converted.

- 1) Before connecting the power cord.
- 2) Turn the VOLTAGE SELECTOR located on the rear panel with a screwdriver until the correct voltage is indicated.



SECTION 1

SERVICE MANUAL

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For basic adjustments, measuring methods, and operating principles, refer to GENERAL TECHNICAL MANUAL.

I. SPECIFICATIONS

POWER AMPLIFIER SECTION

RATED POWER OUTPUT (2 channels Driven)	8 ohms 45W x 2/0.02%	4 ohms 45W x 2/0.05%
20 Hz to 20 kHz		
1 kHz	48W x 2	
POWER BAND WIDTH (IHF -3 dB, 8 ohms)	10 Hz to 60 kHz/0.5%	
SIGNAL TO NOISE RATIO		
PHONO	78 dB	
AUX/TUNER/TAPE	100 dB	
RESIDUAL NOISE (8 ohms, IHF-A)	300 μ V	
CHANNEL SEPARATION (1 kHz)	60 dB	
DAMPING FACTOR (1 kHz, 8 ohms)	50	
OUTPUT REQUIRED SPEAKER IMPEDANCE		
SPEAKERS	4 ohms to 16 ohms (A or B) 8 ohms to 16 ohms (A and B)	

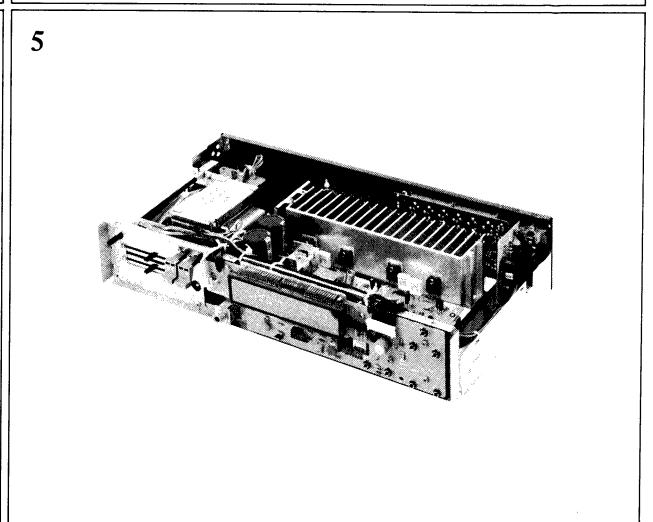
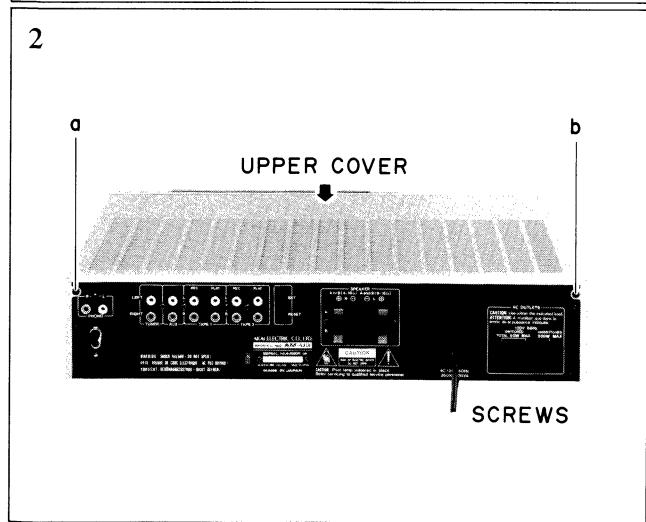
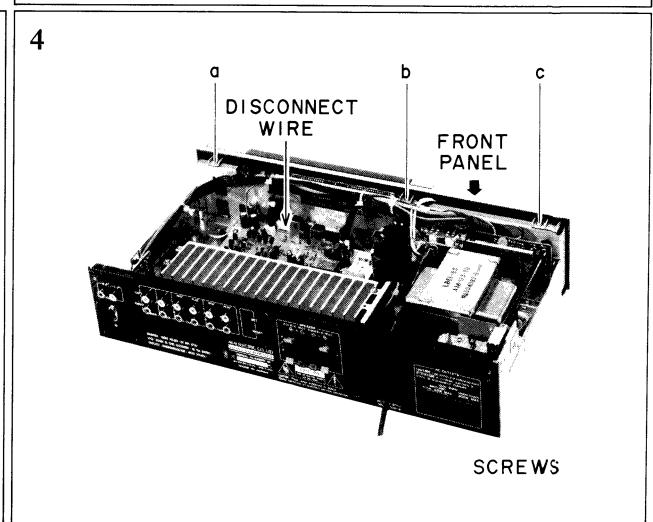
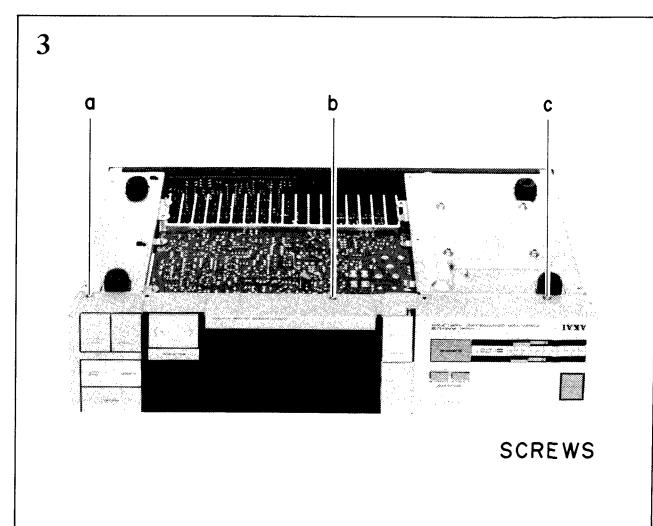
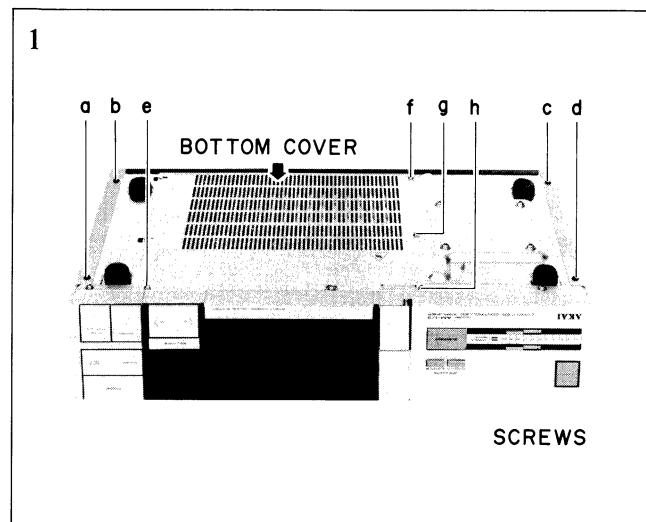
PRE AMPLIFIER SECTION

INPUT SENSITIVITY/IMPEDANCE	PHONO AUX TUNER TAPE PLAY	2.5 mV/47 kohms 150 mV/47 kohms 150 mV/47 kohms 150 mV/47 kohms
OUTPUT LEVEL	TAPE REC	150 mV/1 kohm
FREQUENCY RESPONSE	PHONO (RIAA Deviation) TUNER/AUX/TAPE	20 Hz to 20 kHz (± 0.5 dB) 5 Hz to 80 kHz (-3 dB)
TONE CONTROL	BASS TREBLE	± 8 dB/100 Hz ± 8 dB/10 kHz
SUBSONIC FILTER		-3 dB/oct at 18 Hz
PHONO MAXIMUM INPUT LEVEL (1 kHz)		60 mV
POWER REQUIREMENT		120V, 60Hz for USA and Canada 220V, 50 Hz for Europe except UK 240V, 50 Hz for UK and Australia 110V/120V/220V/240V switchable 50/60 Hz for other countries.
POWER CONSUMPTION		250W (U), 260W (A), 300VA (C), 360W (E, V), 450W (B, S)
DIMENSIONS		440(W) x 98(H) x 264(D) mm (17.3 x 3.9 x 10.4 inches)
WEIGHT		6.7 kg (14.7 lbs)

* For improvement purposes, specifications and design are subject to change without notice.

II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs. Reassemble in reverse order.



III. CONTROLS

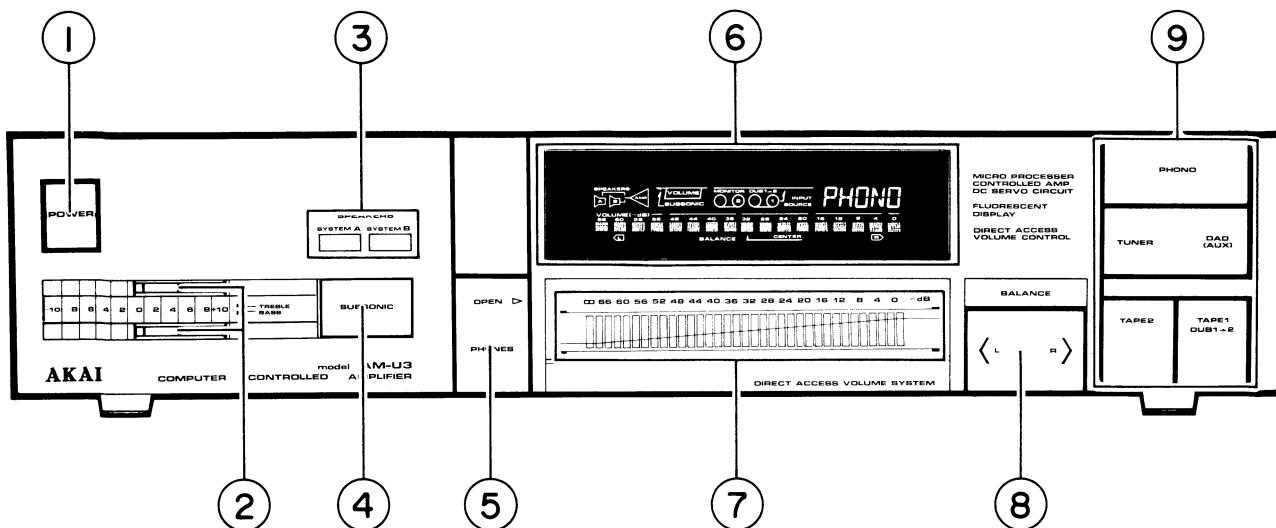


Fig. 3-1 Front View

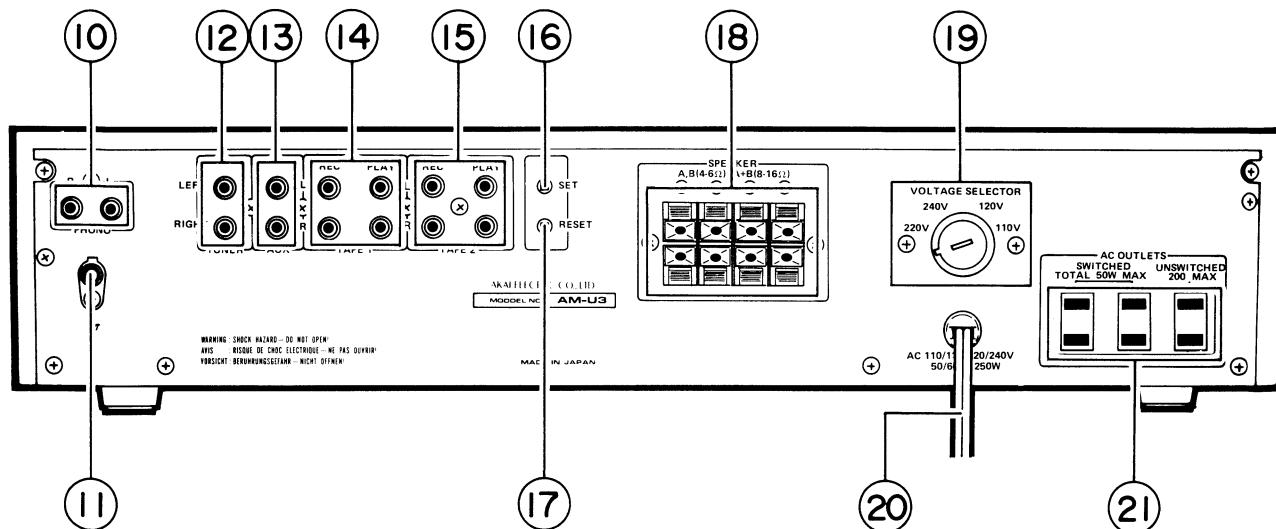


Fig. 3-2 Rear View

- 1. POWER SWITCH
- 2. TONE CONTROLS (BASS, TREBLE)
- 3. SPEAKER SELECTORS (A and B)
- 4. SUBSONIC FILTER SWITCH
- 5. HEADPHONE JACK (Behind PANEL)
- 6. FL DISPLAY
- 7. DIRECT ACCESS VOLUME CONTROL
- 8. BALANCE CONTROLS
- 9. INPUT SOURCE SELECTORS (PHONO, TUNER, DAD/AUX, TAPE 2 and TAPE 1/DUB 1-2)
- 10. PHONO JACKS
- 11. GROUND TERMINAL
- 12. TUNER JACKS
- 13. AUX JACKS
- 14. TAPE 1 (REC/PLAY) JACKS
- 15. TAPE 2 (REC/PLAY) JACKS
- 16. SET BUTTON
- 17. RESET BUTTON
- 18. SPEAKER TERMINALS (A and B)
- 19. VOLTAGE SELECTOR (U model only)
- 20. AC POWER CORD
- 21. AC OUTLETS (Not on some models)

V. OPERATION OF CONTROL IC AM-100 PERIPHERAL CIRCUIT

1. AM-100 PERIPHERAL BLOCK DIAGRAM

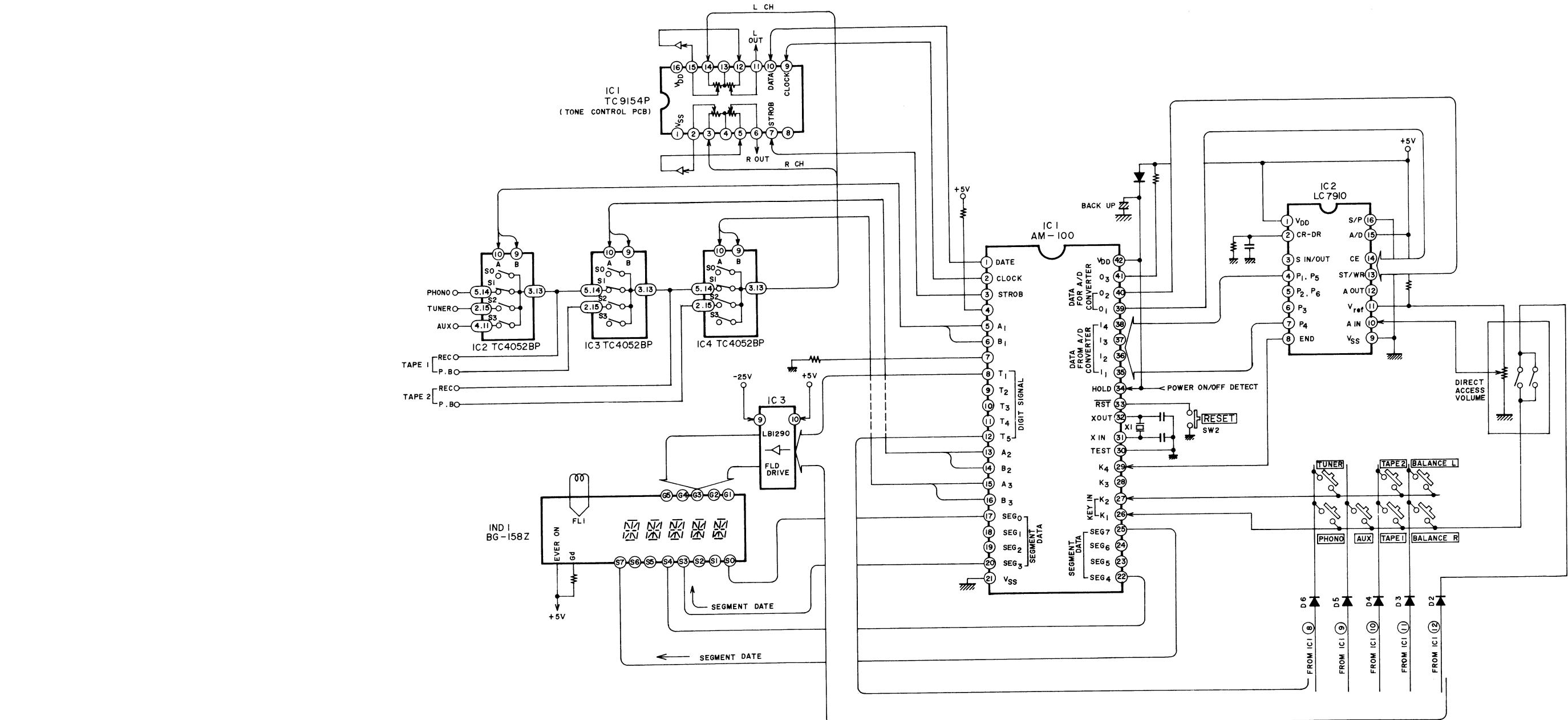


Fig. 5-1 Block Diagram of AM-100 Peripheral

IV. PRINCIPAL PARTS LOCATION

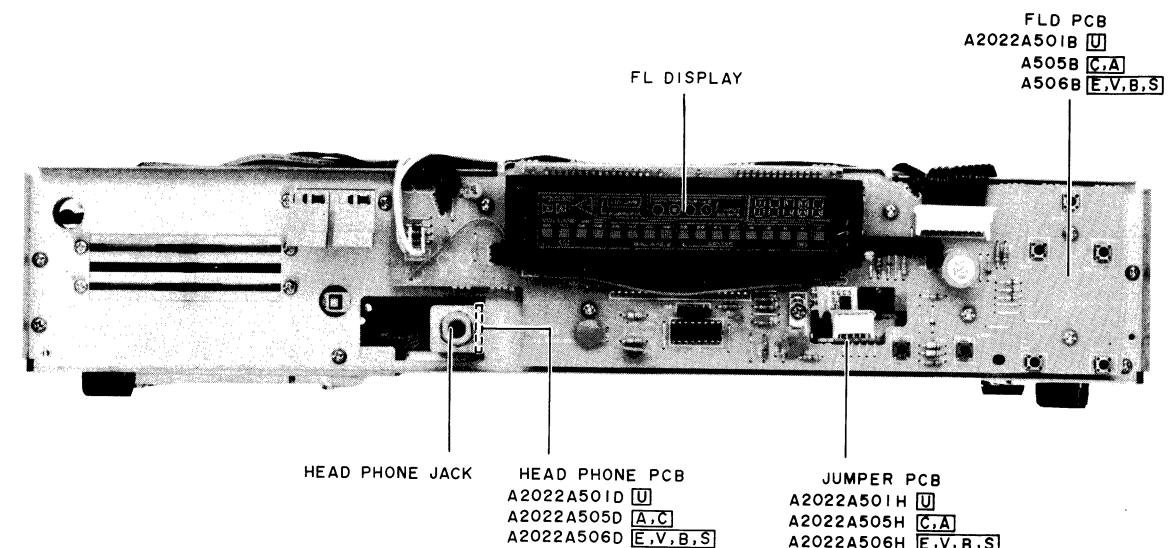


Fig. 4-1 Front View

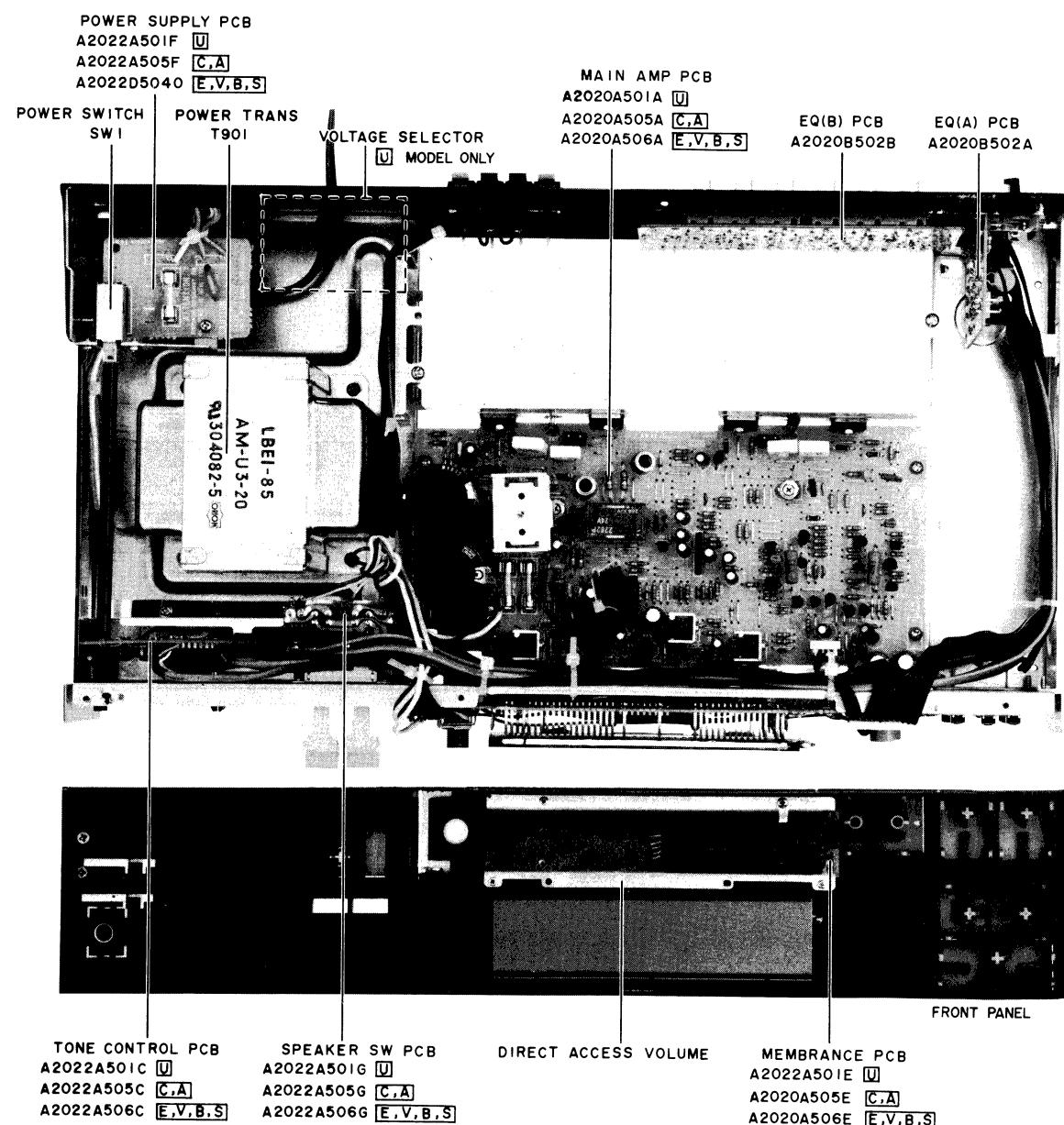


Fig. 4-2 Top View

2. AM-100 TERMINALS DESCRIPTION

No.	Terminal Description	Function
1	DATA	Electronic Volume Control
2	CLOCK	
3	STROB	
4		Unused
5	A1	FUNCTION SW Select Signal (TUNER, PHONO, AUX)
6	B1	
7		Unused
8	T1	DIGIT Signal
9	T2	
10	T3	
11	T4	
12	T5	
13	A2	FUNCTION SW Select Signal (A2, B2) TAPE 1 (A3, B3) TAPE 2
14	B2	
15	A3	
16	B3	
17	SEG 0	SEGMENT DATA for Display
18	SEG 1	
19	SEG 2	
20	SEG 3	
21	Vss	GROUND
22	SEG 4	SEGMENT DATA for Display
23	SEG 5	
24	SEG 6	
25	SEG 7	
26	K1	KEY INPUT
27	K2	
28	K3	Unused
29	K4	Input END Signal from IC2 (LC7910)
30	TEST	GROUND
31	Xin	Clock OSC
32	Xout	
33	<u>RST</u>	RESET
34	HOLD	POWER ON/OFF DETECT
35	I1	DATA from A/D CONVERTER
36	I2	
37	I3	
38	I4	
39	O1	DATA for A/D CONVERTER
40	O2	
41	O3	Unused
42	VDD	+5V

3. DISPLAY DATA

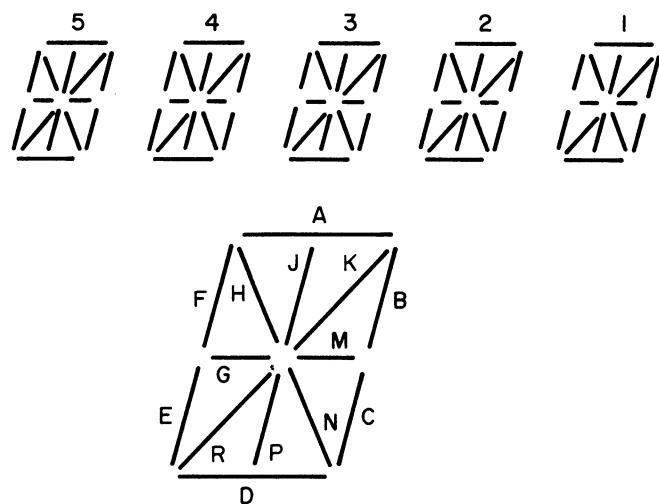
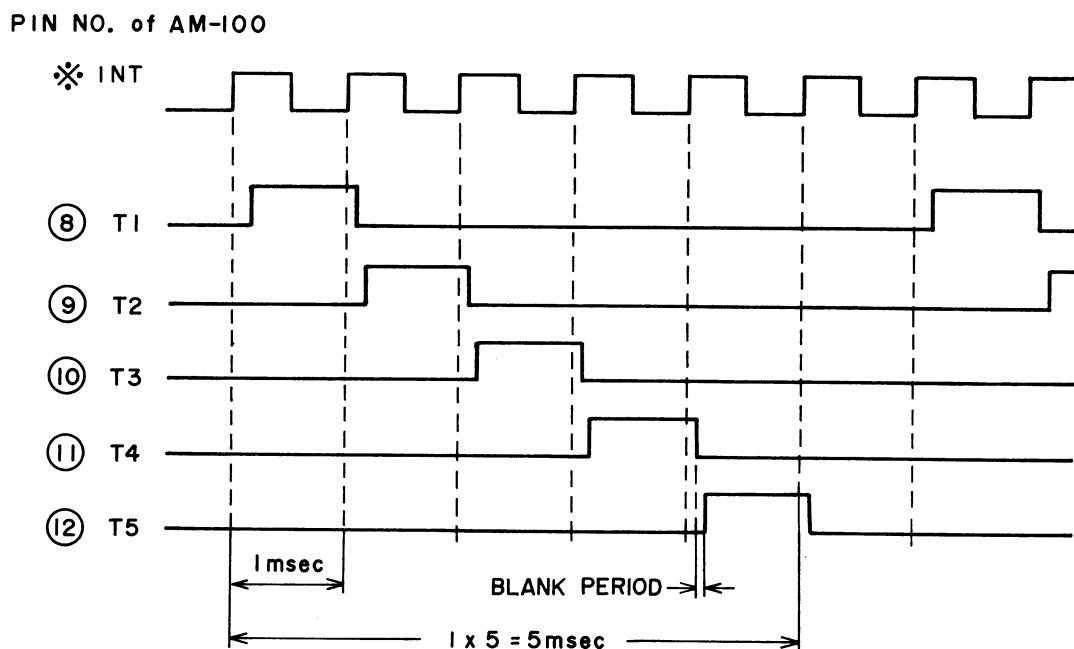


Fig. 5-2

Digit Signal		T1 (5G)	T2 (4G)	T3 (3G)	T4 (2G)	T5 (1G)
Pin No.	Pin No.	8	9	10	11	12
SEG 7	25	—	—	○ ②	—	(PHONO) + (TUNER) + (AUX) 4F, 4E, 4B, 4C, 3F, 3E, 3B, 3C
SEG 6	24	—	—	DUB 1 → 2 ○ ①	—	(PHONO) + (AUX) 4G, 4M, 3D, 2H, 2N
SEG 5	23	◀ L (BALANCE)	BALANCE	▲ CENTER (BALANCE)	▶ R (BALANCE)	(PHONO) + (TUNER) 5A, 2F, 2E, 1A, 1B, 1F, 1E
SEG 4	22	VOLUME [-dB] 66 60 56 52	48 44 40 36 (BALANCE)	32 28 24 20 (BALANCE)	16 12 8 4 (BALANCE)	(PHONO) 5B, 5M, 5G, 5F, 5E 3A, 2B, 2C, 1C, 1D
SEG 3	20	VOLUME 52	VOLUME 36	VOLUME 20	VOLUME 4	(TUNER) 5J, 5P, 4D, 3H, 3N, 2A 2D, 2G, 2M, 1G, 1M, 1N
SEG 2	19	VOLUME 56	VOLUME 40	VOLUME 24	VOLUME 8	(AUX) 4A, 2K, 2R
SEG 1	18	VOLUME 60	VOLUME 44	VOLUME 28	VOLUME 12	0 (VOLUME)
SEG 0	17	VOLUME 66	VOLUME 48	VOLUME 32	VOLUME 16	VOLUME 0

4. DIGIT OUTPUT OF AM-100



* This waveform can not be observed since it is generated in the IC1 (AM-100) internally and there are no pins available for its observation.

Fig. 5-3 Digit Output Timing

Frequency divider timer interrupts are generated in $fc/2^{12}$ ($fc = 4.1943$ MHz : Basic clock), and outputs made to T1, T2, T3, T4, and T5 at the timing shown in Fig. 5-3. The key matrix input acknowledgement and the FLD (fluorescent display) drive are exerted by these digit outputs.

5. AUDIO INPUT SELECTOR/CONTROL

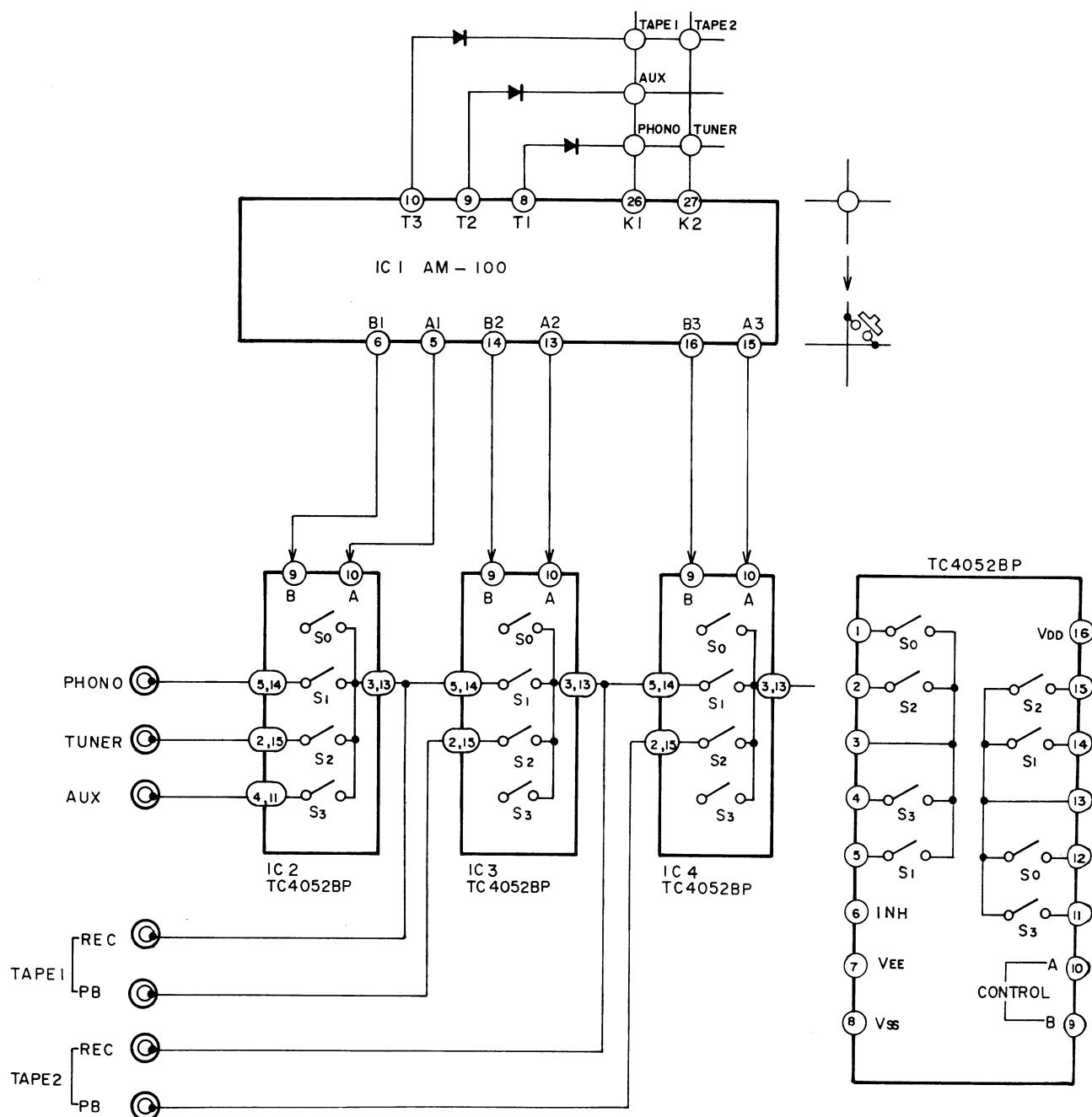


Fig. 5.4 Input Selector/Control System

B	A	ANALOGUE SW	FUNCTION	TAPE 1	TAPE 2
L	L	S ₀	—	—	—
L	H	S ₁	PHONO	OFF	OFF
H	L	S ₂	TUNER	ON	ON
H	H	S ₃	AUX	—	—

Table 1 Truth Table of Analogue SW IC (TC4052BP)

A block diagram for the audio input selector/control has been shown in Fig. 5-4., the IC1 (AM-100) input control ports have been arranged as described below.

Pin No. of AM-100

- ⑤ A1 → Function SW IC (IC2: TC4052BP) Control
- ⑥ B1 → TAPE 1 ON/OFF SW IC (IC3: TC4052BP) Control
- ⑬ A2 → TAPE 1 ON/OFF SW IC (IC3: TC4052BP) Control
- ⑭ B2 → TAPE 2 ON/OFF SW IC (IC4: TC4052BP) Control
- ⑮ A3 → TAPE 2 ON/OFF SW IC (IC4: TC4052BP) Control
- ⑯ B3 → TAPE 2 ON/OFF SW IC (IC4: TC4052BP) Control

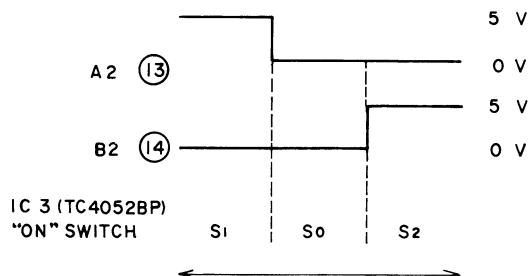


Fig. 5-5 Output of AM-100 Pin ⑬, ⑭ (TAPE 1)

Incidentally, the modes that correspond to the status at the individual ports have been shown in Table 1. In the case of switches for functions, when a key is pushed, that mode will directly be phased into, but in the case of Tape 1 and Tape 2, if mode transition for "on to off" or "off to on" were effected directly, possibilities would arise for the period to emerge where S1 and S2 both remain conductive, so that an "L" level is arranged to be temporarily output to A and B (for only So to be on) first, for phasing into the object mode to be effected afterward. This situation is illustrated in Fig. 5-5 and 5-6.

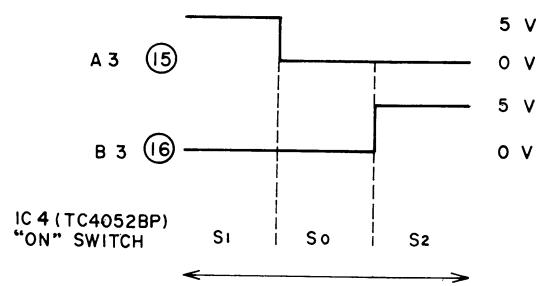


Fig. 5-6 Output of AM-100 Pin ⑮, ⑯ (TAPE 2)

6. LC7910 TERMINALS DESCRIPTION

Pin No.	Symbol	Description
1	VDD	+5V.
2	CR	CR connector terminal for A/D conversion time.
3	Sin/out	A/D converter data output terminal at serial output mode. A/D converter out while CE is "H".
4	P1/P5	A/D converter data output terminal at parallel output mode. A/D converter out while CE is "H".
5	P2/P6	
6	P3	
7	P4	
8	END	After the A/D conversion is ended, this terminal becomes "H". This END output is reset by the input of ST-WR, and keeps "L" until next A/D conversion ends.
9	Vss	GND
10	Ain	A/D converter input terminal.
11	Vref	Standard power supply for A/D converter.
12	Aout	D/A converter output terminal.
13	ST-WR	A/D conversion start command input terminal. A/D conversion starts at the down-edge portion of the pulse from MI-COM IC1 Pin ⑩.
14	CE	After the A/D conversion (END OUT "H"), it controls to get A/D converter data from P1 to P6 or S whenever the pulse is supplied to CE terminal.
15	A/D	Conversion mode (A/D or D/A) selection terminal "H" → A/D mode "L" → D/A mode
16	S/P	Output mode (Serial/Parallel) selection terminal "H" → Serial "L" → Parallel

7. DIRECT ACCESS VOLUME

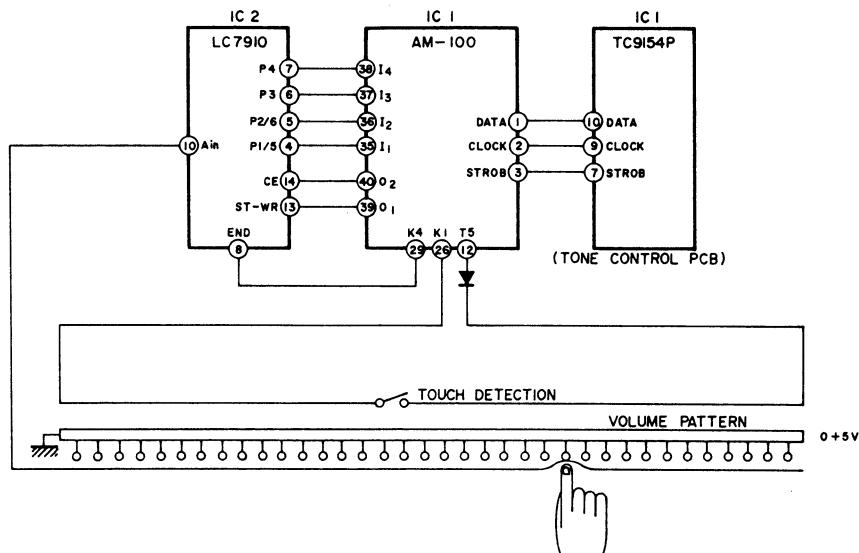


Fig. 5-7 Direct Access Volume Block Diagram

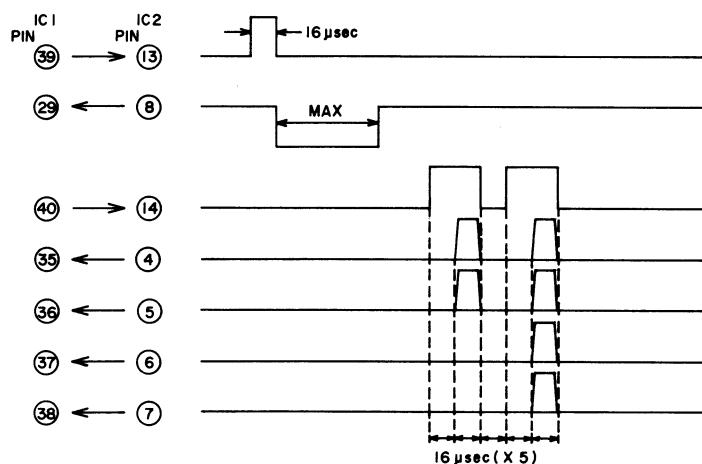


Fig. 5-8 Direct Access Volume Control Signal

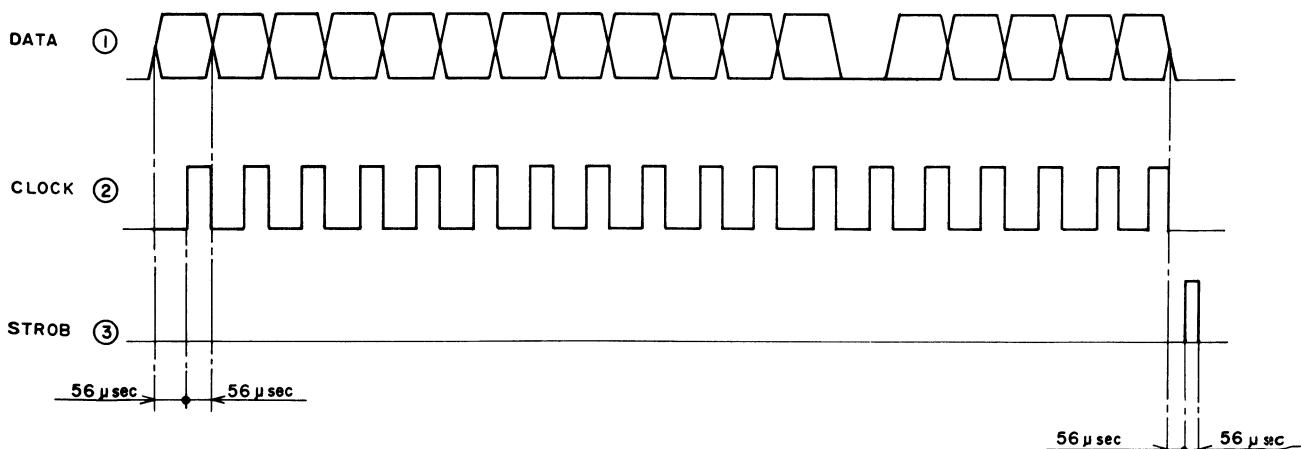


Fig. 5-9 Electronic VR IC1 (TC9154P) Control Signals

When the volume control operating area is touched with a finger, a touch detecting switch will turn on. This switch is connected to a key matrix formed by IC1 (AM-100) pins ⑫ (T5) and ⑯ (K1), for the IC1 (AM-100) to detect the operation of the switch. Then, from pin ⑯ (01), the IC1 (AM-100) will output a 16 μ sec pulse to A/C converter IC2 (LC7910) pin ⑬ (ST-WR). By this process, the IC2 (LC7910) will be made to start A/D converting the voltage applied to its pin ⑩ (Ain). At this point in time, the voltage applied to IC2 (LC7910) pin ⑩ (Ain) is made to correspond to the touched position as expressed in integral multiples

of a 35th of the voltage (about 5V) that is applied to the volume pattern of the membrane volume control.

Next, as the A/D conversion is concluded, IC2 (LC7910) pin ⑧ (END) will attain "L" \rightarrow "H", and this change will be detected by IC1 (AM-100). After this, IC1 (AM-100) outputs a 16 μ sec pulse out of pin ⑭ to IC2 (LC7910) pin ⑯ (CE), to receive two leading bits (P5 and P6) of the converted data, and another 16 μ sec pulse 16 μ sec later, to receive four trailing bits (P1, P2, P3, and P4) of the same data. Based on this data, IC1 (AM-100) will then transfer the required serial data to electronic VR IC1 (TC9154P).

8. INTERNAL BLOCK DIAGRAM OF TC9154P (VOLUME)

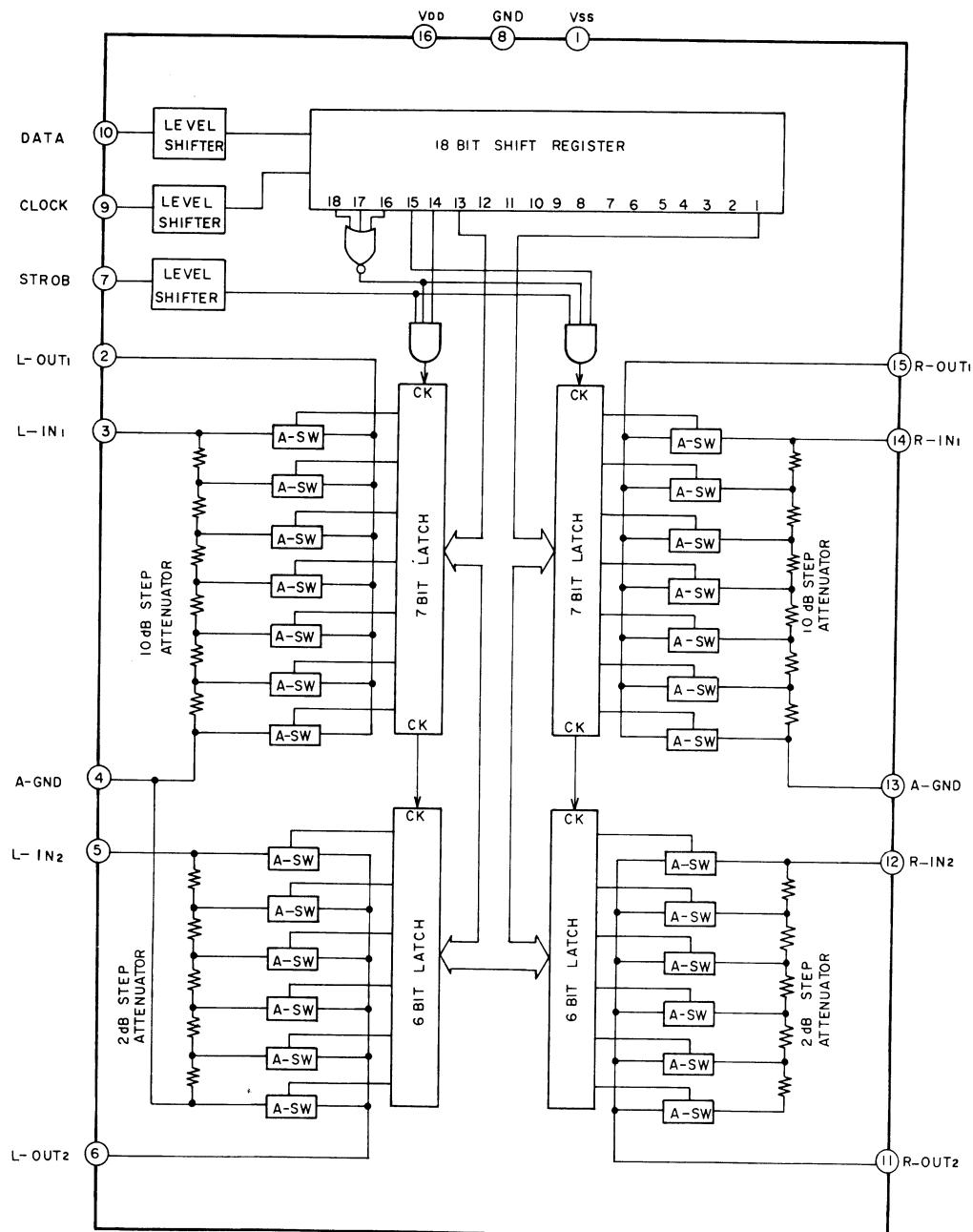


Fig. 5-10 Internal Block Diagram of TC9154P

9. KEY INPUT

9-1. KEY INPUT DETECTION

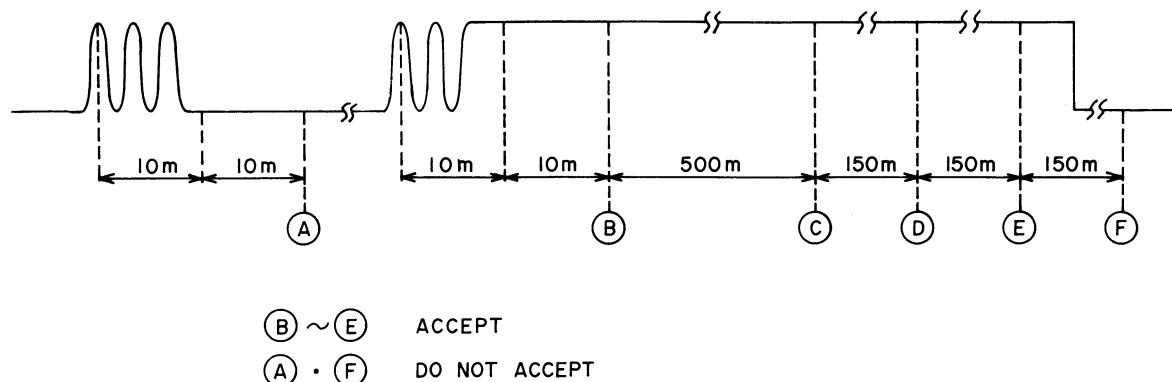


Fig. 5-11 Key Input Detection Timing Chart

Key inputs are detected at the following predesignated timing:

Chattering prevented time = 20 msec

Hold key = 500 msec

(150 msec for a second or later input)

This situation is illustrated in Fig. 5-11.

In other words, when a key is pushed for 20 msec, it

will be acknowledged as the first key input, after which if the key continues to be held down for 500 msec, it will be acknowledged as the second input, while if the key still continues to be held down, it will be acknowledged as the third input, the fourth, and so on, for every 150 msec thereafter.

9-2. INHIBITION OF MULTIPLE PUSHES

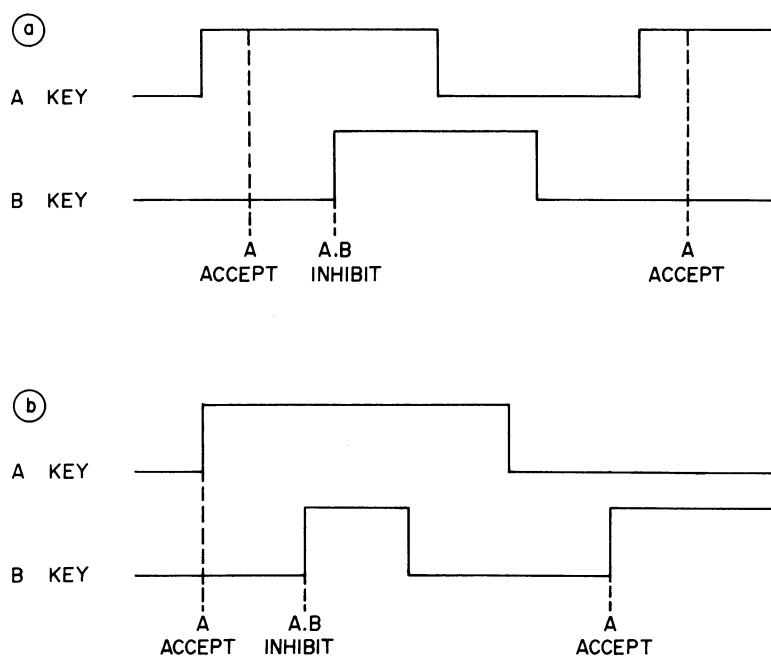


Fig. 5-12 Multiple Pushes Inhibition Timing Chart

Multiple pushes are all inhibited. Specifically, at the point in time when multiple keys have been pushed together, a state will be created where none of the keys are acknowledged any longer, and acknowledge-

ment of the next key will be inhibited until after all of the keys have been released. This situation is illustrated in Fig. 5-12.

10. THE INITIAL STATUS WILL BE ESTABLISHED WHEN RESET BUTTON IS PRESSED

The status of various blocks as set upon the initial switching on of power and upon operating the reset key is shown in Table 2.

Point	Status
FUNCTION	TUNER
TAPE 1	OFF
TAPE 2	OFF
VOLUME	40 dB
BALANCE	CENTER
VOLUME SAFETY POINT	When the set key is not operated within one minute after accessing the reset key, the max. (0 dB) point will be set, while when it is operated, the current volume control position will be set.

Table 2

11. RESET STATUS WHEN POWER IS TURNED ON

With AM-100, when power is switched off, the clock will be halted and a hold exercised, for the backup capacitor to preserve the internal status. Accordingly, the last station will basically be made restorable.

Point	Status
FUNCTION	Last station
TAPE 1	Last station
TAPE 2	Last station
BALANCE	Last station
VOLUME	When switched off at below 20 dB → The last station When switched off at 20 dB or above → 26 dB When switched off while during operation, the point of destination intended will be restorable subject to the above conditions.
BALANCE Display	VOLUME Display
SAFETY POINT	Last station

Table 3

12. VOLUME

12-1. VOLUME CONTROL STEPS

The steps total 35 in number, including 2 dB steps for 0 dB to -66 dB and the -∞ step.

12-2. FADING

With the direct access volume control, display will promptly be made of the position touched, but the sound volume will be faded in toward the touch designated level at 2 dB/60 msec. All key inputs during the fading operation will be acknowledged and duly processed, and the fading will also continue to be exercised thereafter. When the volume control is touched for a second time during the fading operation, the fading destination will be changed to the new position and fading exercised toward it from the current volume control position, rather than completing the current fading operation toward the old destination and starting again from there to fade in toward the new destination.

13. BALANCE

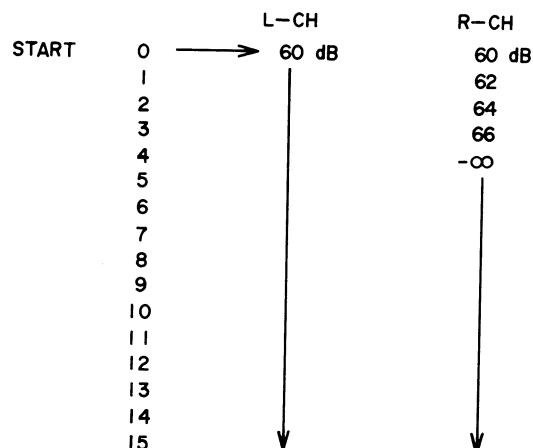


Table 4

Balance Steps

The steps total 15 each in number toward L and R from the center at 2 dB per step, enabling up to a 30 dB deviation in each direction, subject, however, to the volume control position.

For instance, when L is pushed at a 60 dB level, the changes will be as shown in Table 4, where at the fourth push and later, R-ch will stay fixed at -∞ all the way to step 15.

14. MANAGEMENT OF EACH KEY

14-1. PHONO, TUNER, AUX

When a key pushed is for the same function as the current one, no change will take place, but when it differs, the processing described below will be executed.

The audio signal switch that corresponds to the key will turn "on". Sound outputs during the switching operation will be muted for the prevention of clicks generated by the analog switch (TC4052BP). However, when Tape 1 or Tape 2 is "on", no muting will be exercised.

14-2. TAPE 1, TAPE 2

The analog switch (TC4052BP) will be operated to switch Tape 1 "off" when it is "on", or to switch it "on" when it is "off". Sound outputs will be muted during the switching operation. No muting, however, will be exercised when Table 2 is "on".

Tape 2 will also be operated in the same manner as the above for Tape 1.

14-3. BALANCE (R), BALANCE (L)

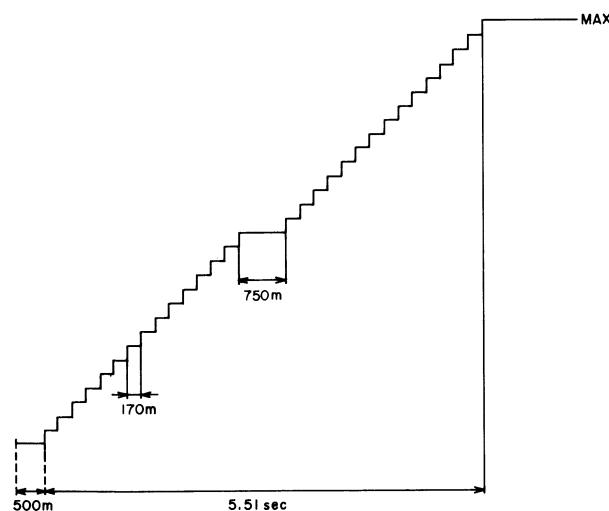


Fig. 5-13 BALANCE Change

1) When pushed for a single shot at a time:

If "volume" is currently displayed, the push will switch the display to a "balance" mode. If "balance" is currently displayed, the push will vary the electronic VR (TC9154P) position by one step (2 dB) toward either R or L. When the extreme R or L position (15 steps or 30 dB away from the center) has been reached, no further pushing of the key in that direction will achieve any change. If after pushing the key, the L or R key is not pushed within 5 seconds, the display will be switched to a "volume" mode.

2) When held down continuously (hold key):

If "volume" is currently displayed, the hold key will first switch the display to a "balance" mode. If "balance" is currently displayed, the hold key will vary the "balance" position by one step. When 500 msec have elapsed after this, the hold key will vary the position by one step in every 170 msec, approximately, thereafter, except when passing the center. At the center, the position will be held for 750 msec.

14-4. VOLUME

If "balance" or "set (safety)" is currently displayed, the display will be switched to that of the present "volume" level. If "volume" is currently displayed, the display will be set for the "volume" level of the position touched, and a fading operation started toward that position. In this process, if the position touched is above the safety position that has been set in advance, it will be regarded to be the safety point. If the position touched is the same as the earlier position, no change will take place.

14-5. SET (SAFETY = VOLUME LIMIT MEMORY)

1) When pushed within one minute after operating the reset key or the initial switching on of power, the current volume control position (or the position of destination if during a fading operation) will be set as the maximum point allowed for the volume level to be at.

2) When one minute has passed, or when a safety point has already been set, display will be made of the safety point. When 5 seconds have elapsed therewith, the original "volume" display will be restored.

When the set (safety) key is not pushed within one minute after operating the reset or the initial switching on of power, setting at the maximum level will automatically be made.

14-6. RESET

Initializes the microcomputer operation. The status set by the initialization is shown in Table 2.

Incidentally, pushing the reset key should basically be exercised when power is on. This is because when the reset key is operated with power off, the AM-100 clock oscillation will take place if charges still remain in the backup capacitor, and may disable normal initializing operations.

VI. IDLING CURRENT ADJUSTMENT

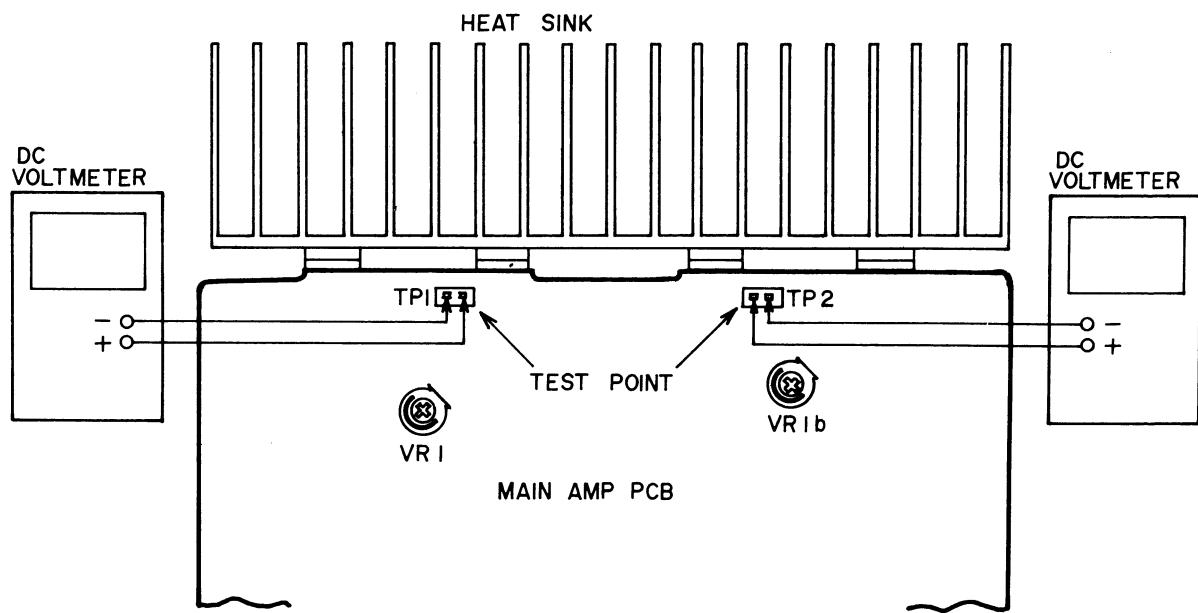


Fig. 6-1 Adjustment Points

After power switch is "ON", connect the DC voltmeter to the test points as shown Fig. 6-1.

Adjust VR1 (left channel) VR1b (right channel) so that the DC Voltmeter Reading is $5 \text{ mV}^{+3\text{mV}}_{-1\text{mV}}$.

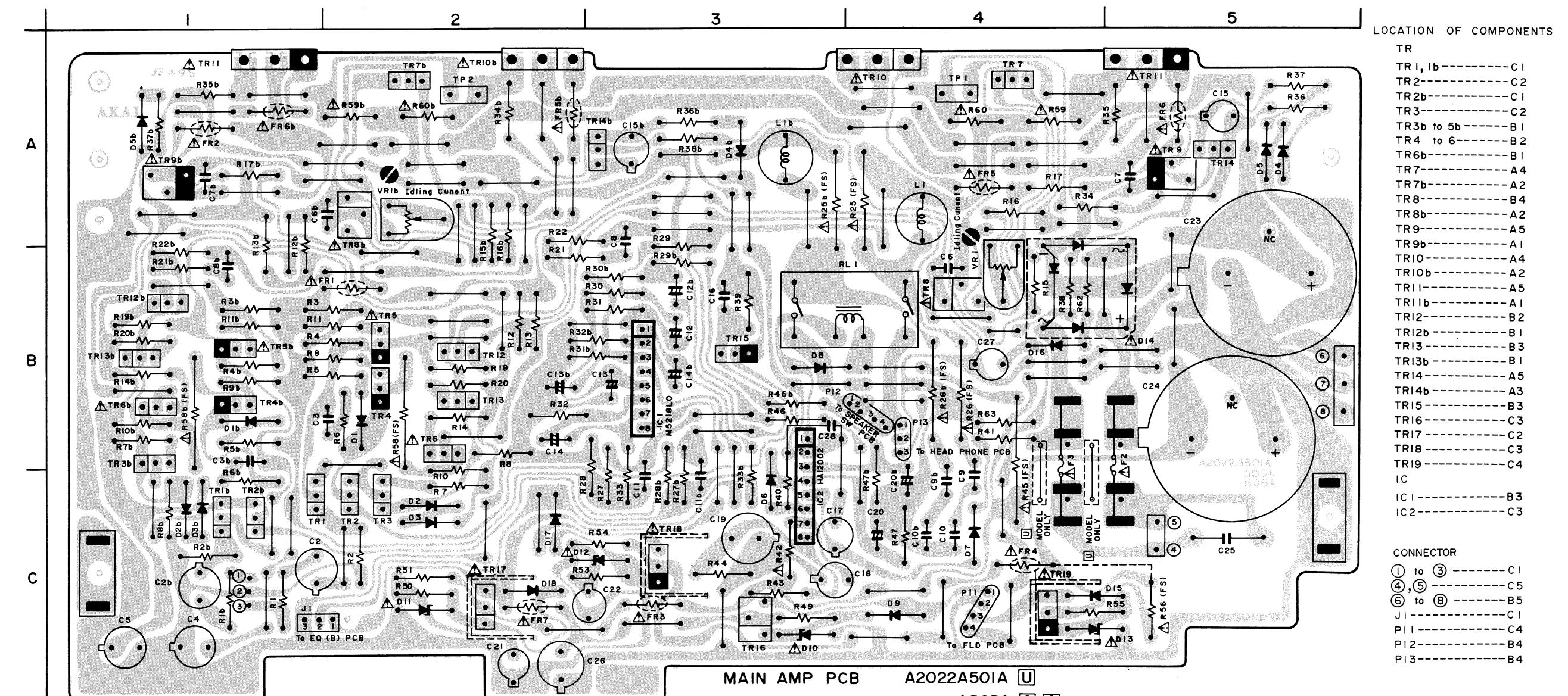
VII. CLASSIFICATION OF VARIOUS P.C BOARDS

1. P.C BOARD TITLES AND IDENTIFICATION NUMBERS

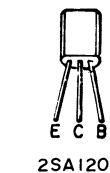
P.C Board Title	P.C Board Number	Remarks
MAIN AMP P.C BOARD	A2022A501A	U
MAIN AMP P.C BOARD	A2022A505A	C, A
MAIN AMP P.C BOARD	A2022A506A	E, V, B, S
FLD P.C BOARD	A2022A501B	U
FLD P.C BOARD	A2022A505B	C, A
FLD P.C BOARD	A2022A506B	E, V, B, S
TONE CONTROL P.C BOARD	A2022A501C	U
TONE CONTROL P.C BOARD	A2022A505C	C, A
TONE CONTROL P.C BOARD	A2022A506C	E, V, B, S
EQ (A) P.C BOARD	A2022B502A	
EQ (B) P.C BOARD	A2022B502B	
HEAD PHONE P.C BOARD	A2022A501D	U
HEAD PHONE P.C BOARD	A2022A505D	C, A
HEAD PHONE P.C BOARD	A2022A506D	E, V, B, S
MEMBRANCE P.C BOARD	A2022A501E	U
MEMBRANCE P.C BOARD	A2022A505E	C, A
MEMBRANCE P.C BOARD	A2022A506E	E, V, B, S
SPEAKER SW P.C BOARD	A2022A501G	U
SPEAKER SW P.C BOARD	A2022A505G	C, A
SPEAKER SW P.C BOARD	A2022A506G	E, V, B, S
FILTER P.C BOARD	A2022C5030	V Model only
POWER SUPPLY P.C BOARD	A2022A501F	U
POWER SUPPLY P.C BOARD	A2022A505F	C, A
POWER SUPPLY P.C BOARD	A2022D5040	E, V, B, S
JUMPER P.C BOARD	A2022A501H	U
JUMPER P.C BOARD	A2022A505H	C, A
JUMPER P.C BOARD	A2022A506H	E, V, B, S

2. COMPOSITION OF VARIOUS P.C BOARDS

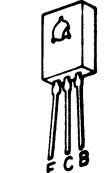
1) MAIN AMP P.C BOARD A2022A501A [U], A2022A505A [C, A], A2022A506A [E, V, B, S]



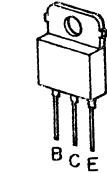
2SA970
2SC2240
2SC2320-33
2SD734



2SA1208
2SC2910



2SA1248
2SC3116



2SB816
2SD1046

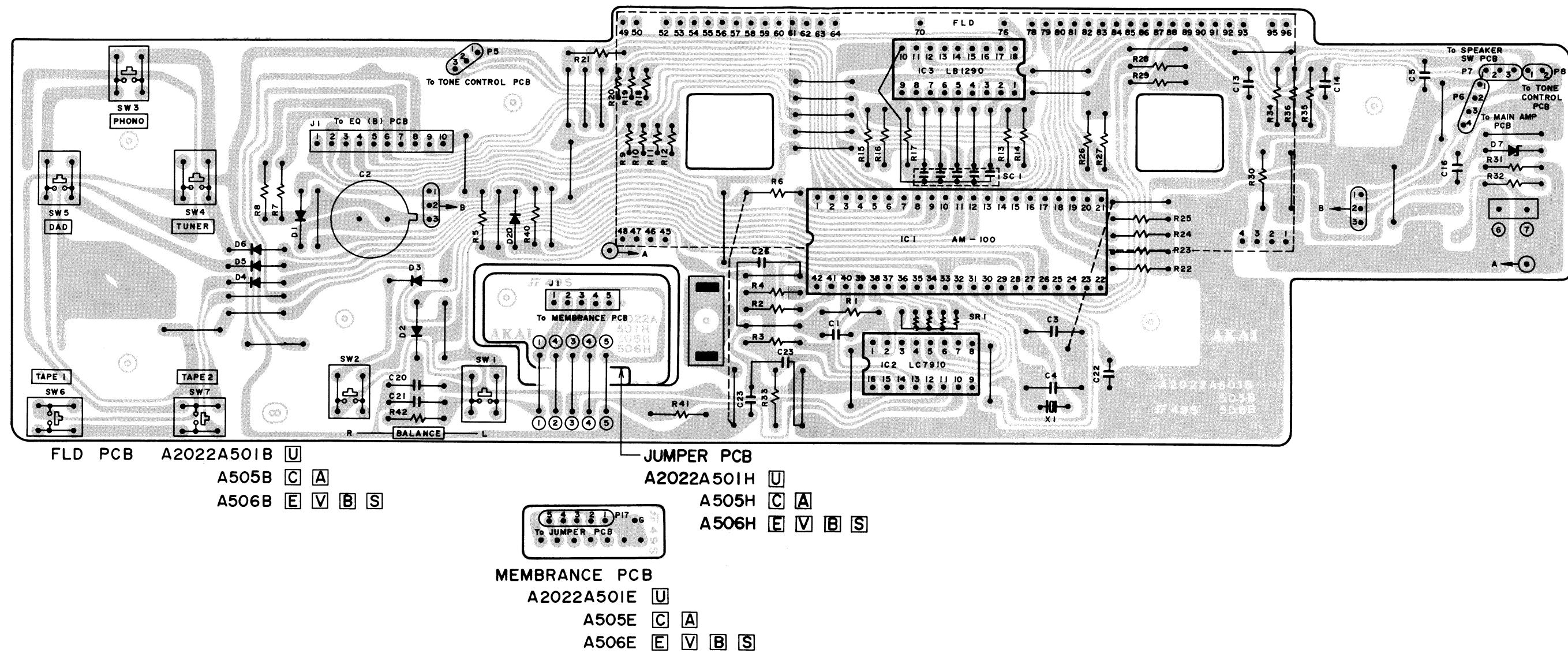
TR

TR1 to 3 ----- 2SC2320-33(E,F)
TR4, 15 ----- 2SA970(GR,BL)
TR5 ----- 2SA1208(R,S,T)
TR6 ----- 2SC2910(R,S,T)
TR7 ----- 2SD734(E,F,G)
TR8, 16, 17 ----- 2SC3116(R,S)
TR9, 18, 19 ----- 2SA1248(R,S)
TR10 ----- 2SD1046(D,E)
TR11 ----- 2SB816(D,E)
TR12 to 14 ----- 2SC2240(GR,BL)

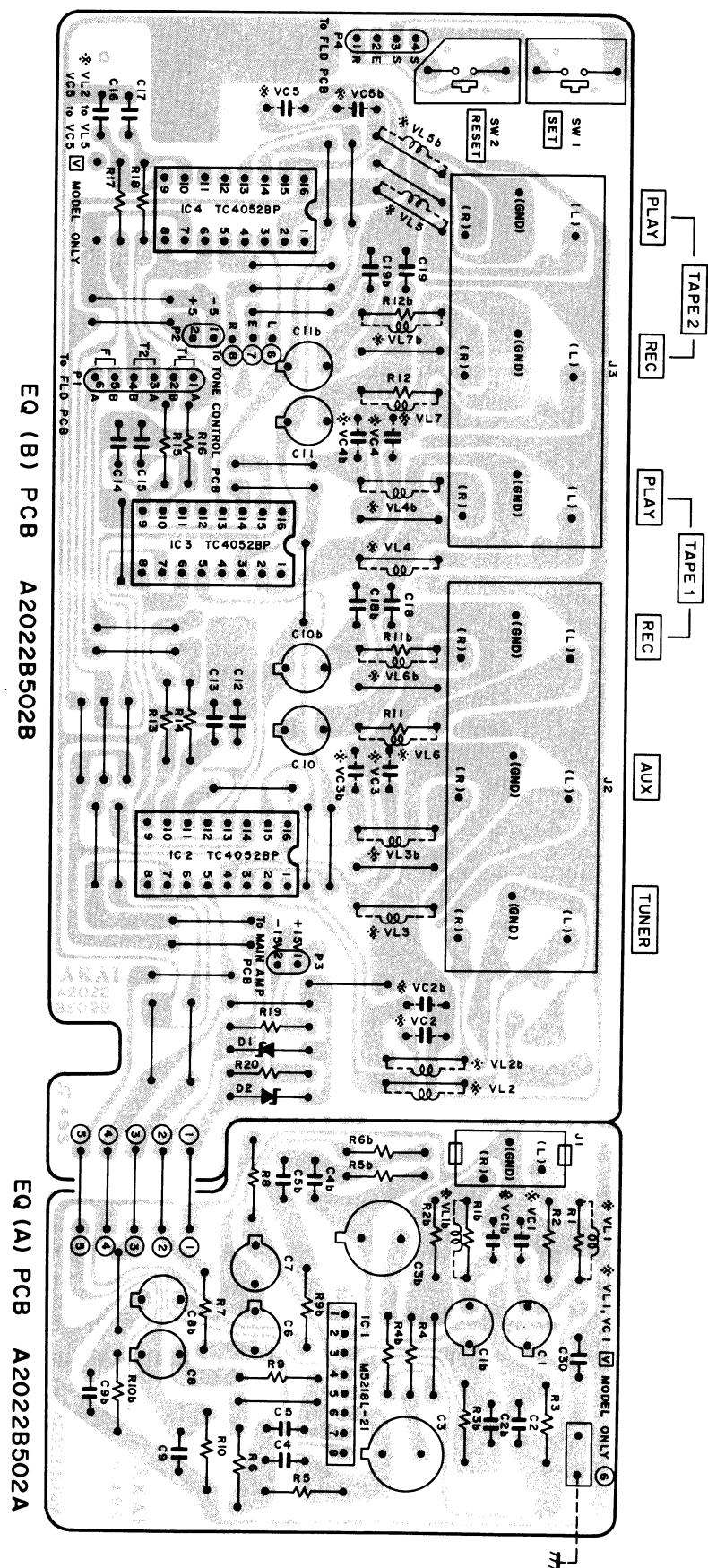
WARNING: \triangle INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

AVERTISSEMENT: \triangle INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ. POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL, NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

2) FLD P.C BOARD A2022A501B [U], A2022A505B [C, A], A2022A506B [E, V, B, S], JUMPER P.C BOARD A2022A501H [U], A2022A505H [C, A], A2022A506H [E, V, B, S] and
MEMBRANCE P.C BOARD A2022A501E [U], A2022A505E [C, A], A2022A506E [E, V, B, S]

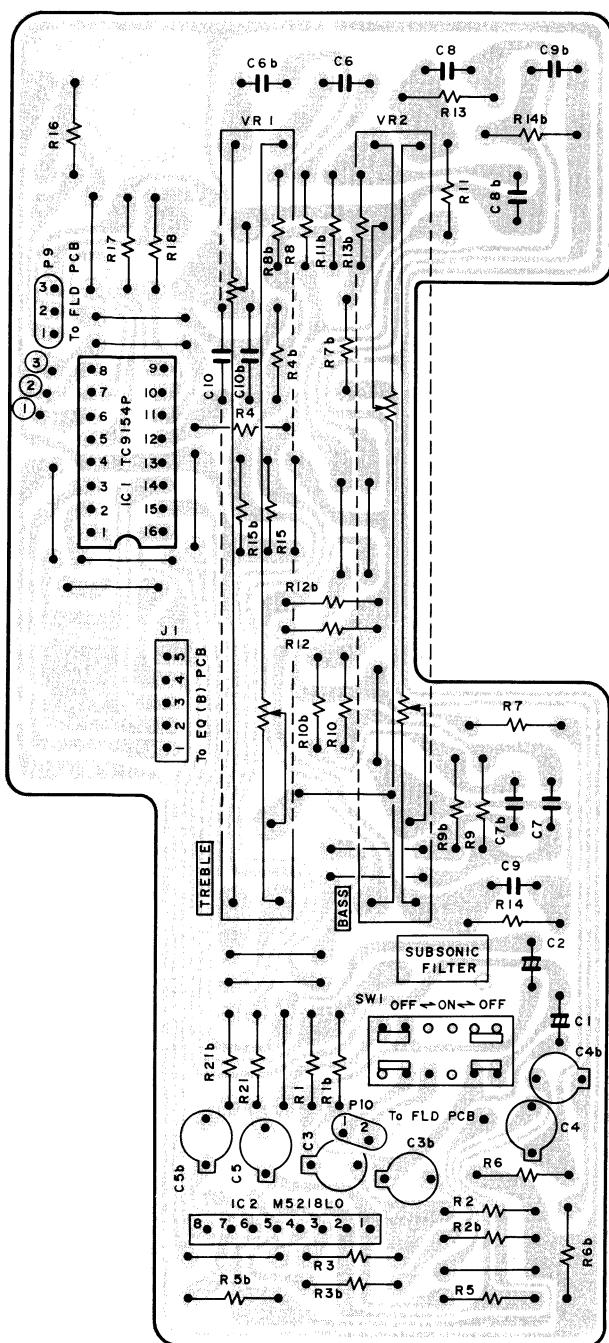


3) EQ (A) P.C BOARD A2022B502A and EQ (B) P.C BOARD A2022B502B



4) TONE CONTROL P.C BOARD A2022A501C U

A2022A505C C, A , A506C E, V, B, S

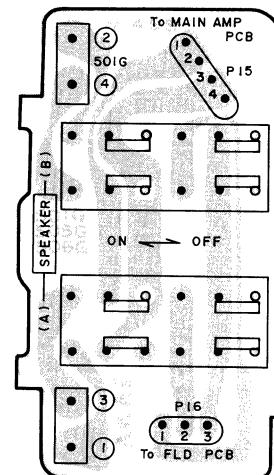


TONE CONTROL PCB
A2022A501C [U]
A505C [C] [A]
A506C [E] [V] [B] [S]

5) SPEAKER SW P.C BOARD

A2022A501G **U**, A2022A505G **C, A**

A2022A506G E, V, B, S



SPEAKER SW PCI

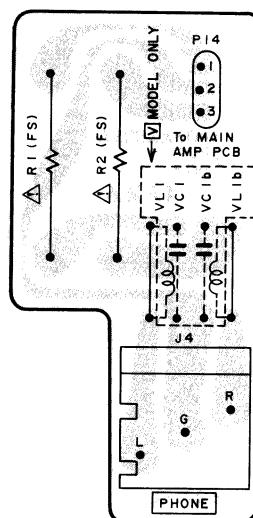
A2022A501G U

A505G C A

6) HEAD PHONE P.C BOARD

A2022A501D U, A2022A505D C, A

A2022A506D E, V, B, S



HEAD PHONE PCB

A2022A501D U

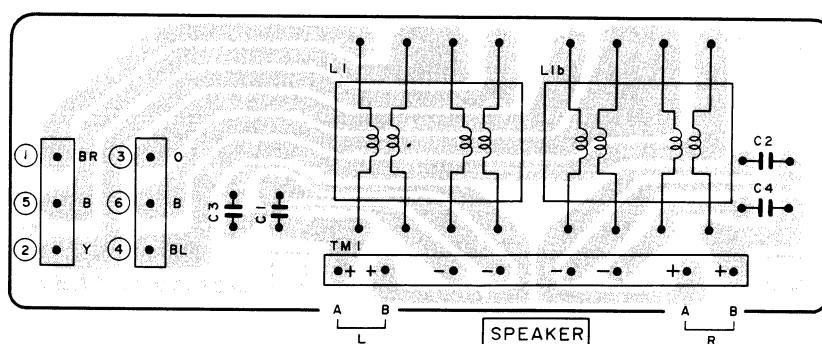
A505D **C** **A**

A506D E V B S

WARNING: **Δ** INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

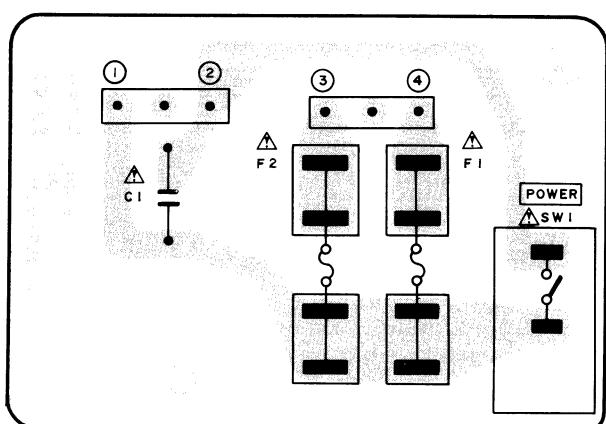
**AVERTISSEMENT: IL INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ.
POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL,
NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT**

7) FILTER P.C BOARD A2022C5030

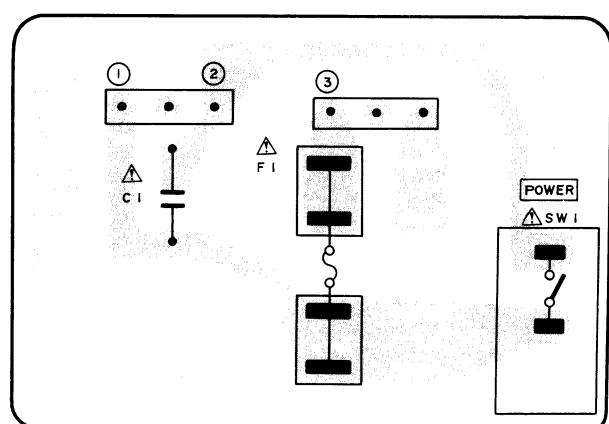


FILTER PCB A2022C5030

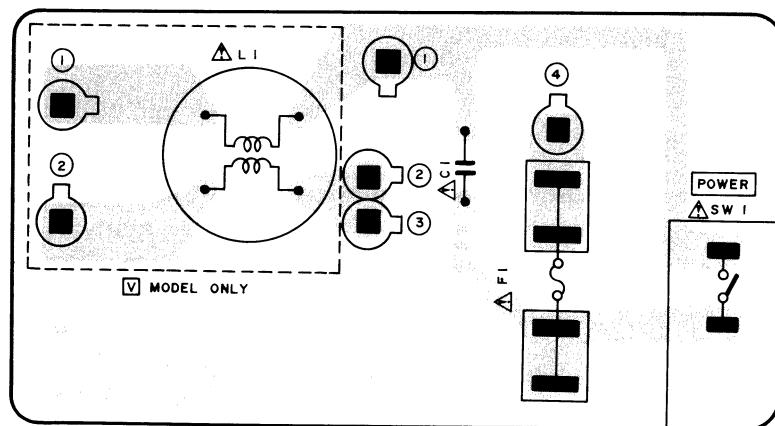
8) POWER SUPPLY P.C BOARD A2022A501F [U], A2022A505F [C, A], A2022D5040 [E, V, B, S]



POWER SUPPLY PCB
A2022A501F [U]



POWER SUPPLY PCB
A2022A505F [C, A]



POWER SUPPLY PCB
A2022D5040 [E, V, B, S]

WARNING: Δ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY,
REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S
RECOMMENDED PARTS.
AVERTISSEMENT: Δ INDIQUE LES COMPOSANTS CRITIQUES DE SÉCURITÉ.
POUR MAINTENIR LE DEGRÉ DE SÉCURITÉ DE L'APPAREIL,
NE REMPLACER QUE DES PIÈCES RECOMMANDÉES PAR LE FABRICANT.

MEMO

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SECTION 2

PARTS LIST

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3. POWER SUPPLY P.C BOARD BLOCK (E, V, B, S)	33
4. FILTER P.C BOARD BLOCK (V ONLY)	33
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6. FINAL ASSEMBLY BLOCK	35
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Resistor and Capacitor which is not listed in this parts list, please refer to COMMON LIST FOR SERVICE PARTS.

ATTENTION

1. When placing an order for parts, be sure to list the parts no. model no., and description. There are instances in which if any of this information is omitted, parts cannot be shipped or the wrong parts will be delivered.
2. Please be careful not to make a mistake in the parts no. If the parts no. is in error, a part different from the one ordered may be delivered.
3. Because parts number and parts unit supply in the Preliminary Parts List may be partially changed, please use this parts list for all future reference.

HOW TO USE THIS PARTS LIST

1. This Parts List shows the parts that are considered necessary for repairs. Other parts, such as resistors and capacitors, are shown in the "Common List for Service Parts". Select and order such parts from the "Common List for Service Parts".
2. The Recommended Spare Parts shows those parts in the Parts List which are considered particularly important for service.
3. Parts not shown in the Parts List and "Common List for Service Parts" will not be supplied in principle.
4. How to read list
 - a) Mechanism Block
 - b) P.C Board Block

2. HEAD BASE BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
2-1x	BH-T2023A320A	HEAD BASE BLOCK GX-F66R
2-2	HP-H2206A010A	HEAD R/P PR4-8FUC
2-3	ZS-477876	PAN20x03STL CMT
2-4	ZS-536488	BID20x08STL CMT
2-5	ZG-402895	CS ANGLE ADJUST SPRING

SP (Service Parts) Classification

A small "x" indicates the inability to show that particular part in the Photo or Illustration.

This number corresponds with the individual parts index number in that figure

This number corresponds with the Figure Number

6. SYS. CON. P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
6-1	BA-T2034A070A	PC SYS CON BLK GX-F44R
6-IC1	EI-324536	IC HD14049BP
6-IC2	EI-336801	IC MB8841-564M
6-IC3	EI-331661	IC SN7405N
6-IC4	EI-336725	IC M54527P
6-TR1to4	ET-200985	TR 2SC2603 F,G
6-TR5to28	ET-554657	TR 2SA733A P,Q
6-D1	ED-318292	D SILICON H 1S2473T-77 T26
6-D2to4	ED-308952	D GERMA V 1K34A-LR F07
6-D5to10	ED-318292	D SILICON H 1S2473T-77 T26
6-X1	EI-318384	OSC X'TAL NC-18C

SP (Service Parts) Classification

This reference numbers corresponds with symbol numbers of Schematic Diagrams.

3.579545MHZ

5. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List. It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index.

WARNING

⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

AVERTISSEMENT

⚠ IL INDIQUE LES COMPOSANTS CRITIQUES DE SURETE. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDÉES PAR LE FABRICANT.

RECOMMENDED SPARE PARTS

Because, if the parts listed below are on hand, almost any repair can be accomplished, we suggest that you stock these Recommended Spare Parts Items.

NO.	PARTS NO.	DESCRIPTION
1	BT-348528	△ TRANS POWER AM-U3-20 (A)
2	BT-348527	△ TRANS POWER AM-U3-30 (C)
3	BT-348529	△ TRANS POWER AM-U3-40 (E,V)
4	BT-348530	△ TRANS POWER AM-U3-50 (B,S)
5	BT-348526	△ TRANS POWER AM-U3-70 (U)
6	EC-346822	COMP C B72C0716-32N
7	ED-200749	△ D SILICON DBA60-K15 400/6.0A
8	ED-343421	△ D ZENER H HZ16L 2
9	ED-346509	△ D ZENER H HZ24FA F10 2
10	ED-346447	△ D ZENER H HZ6FA F10 A1
11	ED-337153	D SILICON H DS446FA5 F10
12	ED-301911	D SILICON H DS448
13	ED-346454	D ZENER H HZ6FA F10 C3
14	ED-343410	D ZENER H HZ6L A1
15	EF-623125	△ FUSE SEMKO T 250V 2.50A
16	EF-690996	△ FUSE SEMKO T 250V 4.00A
17	EF-306951	△ FUSE TSC A 250V 2.50A
18	EF-306957	△ FUSE TSC 125V 4.00A
19	EF-346139	△ FUSE TSC 125V 5.00A
20	EI-337228	△ IC M5218L0
21	EI-345478	IC AM100
22	EI-345474	IC HA12002
23	EI-337013	IC LB1290
24	EI-345479	IC LC7910
25	EI-346071	IC M5218L-21
26	EI-337228	IC M5218L0
27	EI-332259	IC TC4052BP
28	EI-343371	IC TC9154P
29	EM-345480	IND FL BG-158Z CHARACTER
30	EO-330256	OSC CE F85-006 4MHZ
31	EQ-337159	RELAY SIGNAL G4Z-2282P 2NO 24V
32	ER-319455	△ R FUSE ERD2FC S10 1/4W 10R0G
33	ER-326169	△ R FUSE ERD2FC S10 1/4W 22R0G
34	ER-318248	△ R FUSE ERD2FC S10 1/4W 47R0G
35	ER-343420	R COMP EXB-P84104K
36	ES-337902	△ SW PUSH SLDL1P 01-1
37	ES-346123	△ SW SELECTOR 0240#13 01-4
38	ES-345481	SW PUSH SEA12 04-2N
39	ES-345476	SW PUSH SUL231S
40	ES-345470	SW TACT KEC10901
41	ES-337680	SW TACT KHH10902
42	ET-345460	△ TR 2SA1208 R,S,T
43	ET-345465	△ TR 2SA1248 R,S
44	ET-345461	△ TR 2SA2910 R,S,T
45	ET-345458	△ TR 2SB816 D,E
46	ET-345463	△ TR 2SC3116 R,S
47	ET-345457	△ TR 2SD1046 D,E
48	ET-345462	△ TR 2SD734 E,F,G
49	ET-305463	TR 2SA970 GR,BL
50	ET-307195	TR 2SC2240 GR,BL
51	ET-328578	TR 2SC2320 E,F
52	EV-345780	R S-FIX H RVF8P01 3P 501
53	EV-345482	VR SLIDE 60L1SVOG 15C104
54	EV-345429	VR TOUCH SENSOR B10K

1. MAIN AMP P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
1-1U	BA-A2022A050A	PC MAIN BLK AM-U3(U)	1-SR1B	ER-343420	R COMP EXB-P84104K
1-1C	BA-A2022A050B	PC MAIN BLK AM-U3(C) (C,A)	1-C2B	EC-344157	C DOUBLE LAYER 473Z 5.5DC
1-1E	BA-A2022A050C	PC MAIN BLK AM-U3(E) (E,B,S)	1-SC1B	EC-346822	COMP C B72C0716-32N
1-1V	BA-A2022A050D	PC MAIN BLK AM-U3(V) (V)			
1-1UP	BA-A2022A050E	PC MAIN BLK AM-U3-P(U)			
1-1CP	BA-A2022A050F	PC MAIN BLK AM-U3-P(C) (C,A)			
1-1EP	BA-A2022A050G	PC MAIN BLK AM-U3-P(E)			
		(E,B,S)			
1-1VP	BA-A2022A050H	PC MAIN BLK AM-U3-P(V) (V)			
MAIN AMP P.C BOARD					
1-IC1A	EI-337228	△ IC M5218L0			
1-IC2A	EI-345474	IC HA12002			
1-TR1Ato3A	ET-328578	TR 2SC2320 E,F			
1-TR4A	ET-305463	TR 2SA970 GR,BL			
1-TR5A	ET-345460	△ TR 2SA1208 R,S,T			
1-TR6A	ET-345461	△ TR 2SA2910 R,S,T			
1-TR7A	ET-345462	TR 2SD734 E,F,G			
1-TR8A	ET-345463	△ TR 2SC3116 R,S			
1-TR9A	ET-345465	△ TR 2SA1248 R,S			
1-TR12Ato14A	ET-307195	TR 2SC2240 GR,BL			
1-TR15A	ET-305463	TR 2SA970 GR,BL			
1-TR16A,17A	ET-345463	△ TR 2SC3116 R,S			
1-TR18A,19A	ET-345465	△ TR 2SA1248 R,S			
1-D1Ato6A	ED-301911	D SILICON H DS448			
1-D7A	ED-337153	D SILICON H DS446FA5 F10			
1-D8A,9A	ED-301911	D SILICON H DS448			
1-D10A	ED-346447	△ D ZENER H HZ6FA F10 A1			
1-D11A,12A	ED-343421	△ D ZENER H HZ16L 2			
1-D13A	ED-346509	△ D ZENER H HZ24FA F10 2			
1-D14A	ED-200749	△ D SILICON DBA60-K15			
		400/6.0A			
1-D15A	ED-301911	D SILICON H DS448			
1-D16A	ED-337153	D SILICON H DS446FA5 F10			
1-D17A,18A	ED-301911	D SILICON H DS448			
1-R25A,26A	ER-308875	△ R CB H S15 FS RDS 1/3W			
		100J			
1-R42A	ER-539087	R OMF H FS 1W 222J			
1-R45A	ER-349039	△ R OMF H SNP FS 2W 681J			
1-R56A	ER-322787	△ R CB H S10 FS RDS 1/4W			
		100J			
1-R58A	ER-345508	△ R OMF H S20 FS 2W 472J			
1-R59A,60A	ER-345466	△ R CT F09 PLATE 5W R22K			
1-FR1A,2A	ER-318248	△ R FUSE ERD2FC S10 1/4W			
		47R0G			
1-FR3A,4A	ER-326169	△ R FUSE ERD2FC S10 1/4W			
		2200G			
1-FR5A,6A	ER-319455	△ R FUSE ERD2FC S10 1/4W			
		10R0G			
1-FR7A	ER-326169	△ R FUSE ERD2FC S10 1/4W			
		22R0G			
1-C12A	EC-343855	C EC V F05 NP SM R22M 50.0DC			
1-C13A,14A	EC-300193	C EC V F05 NP SM 100M 16DC			
1-C20A	EC-200949	C EC V F05 NP SM 470M 10DC			
1-VR1A	EV-345780	R S-FIX H RVF8P01 3P 501			
1-RL1A	EQ-337159	RELAY SIGNAL G4Z-2282P			
		2NO 24V			
1-L1A	EO-337880	COIL FIX 2 202AK-018 2.20UH			
1-F2C,3C	EF-346139	△ FUSE TSC 125V 5.00A(F2) (C,A)			
1-F2E,3E	EF-690996	△ FUSE SEMKO T 250V 4.00A (F2) (E,V,B,S)			
FLD P.C BOARD					
1-IC1B	EI-345478	IC AM100			
1-IC2B	EI-345479	IC LC7910			
1-IC3B	EI-337013	IC LB1290			
1-D1Bto6B	ED-301911	D SILICON H DS448			
1-D7B	ED-346454	D ZENER H HZ6FA F10 C3			
1-D20B	ED-301911	D SILICON H DS448			
1-SW1Bto7B	ES-336780	SW TACT KHH 10902			
1-IND1B	EM-345480	IND FL BG-158Z CHARACTER			
1-X1B	EO-330256	OSC CE F85-006 4MHZ			

2. EQ P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
2-1U	BA-A2022A040A	PC EQ BLK QM-U7(U) (EXCEPT V)
2-1V	BA-A2022A040B	PC EQ BLK AM-U3(V)
EQ (A) P.C BOARD		
2-IC1A	EI-346071	IC M5218L-21
2-J1A	EJ-345469	PIN J YKC21-0093
2-VL1A	EO-337684	COIL FIX 2 FL12R751E 750UH (V)
EQ (B) P.C BOARD		
2-IC2B to 4B	EI-332259	IC TC4052BP
2-D1B,2B	ED-343410	D ZENER H HZ6L A1
2-J2B,3B	EJ-345468	PIN J YKC21-0092
2-SW1B,2B	ES-345470	SW TACT KEC10901
2-VL2B to 7B	EO-345920	COIL FIX 1 LAL03KH 33.00UH K (V)

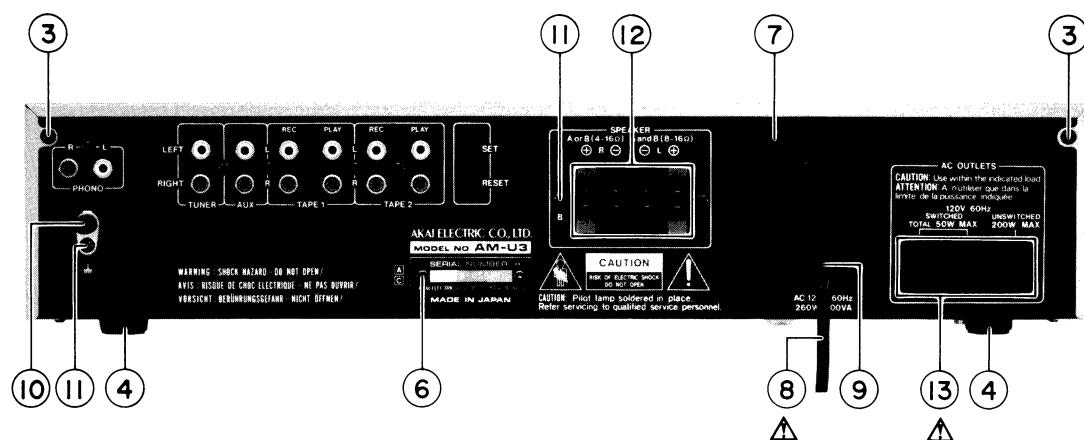
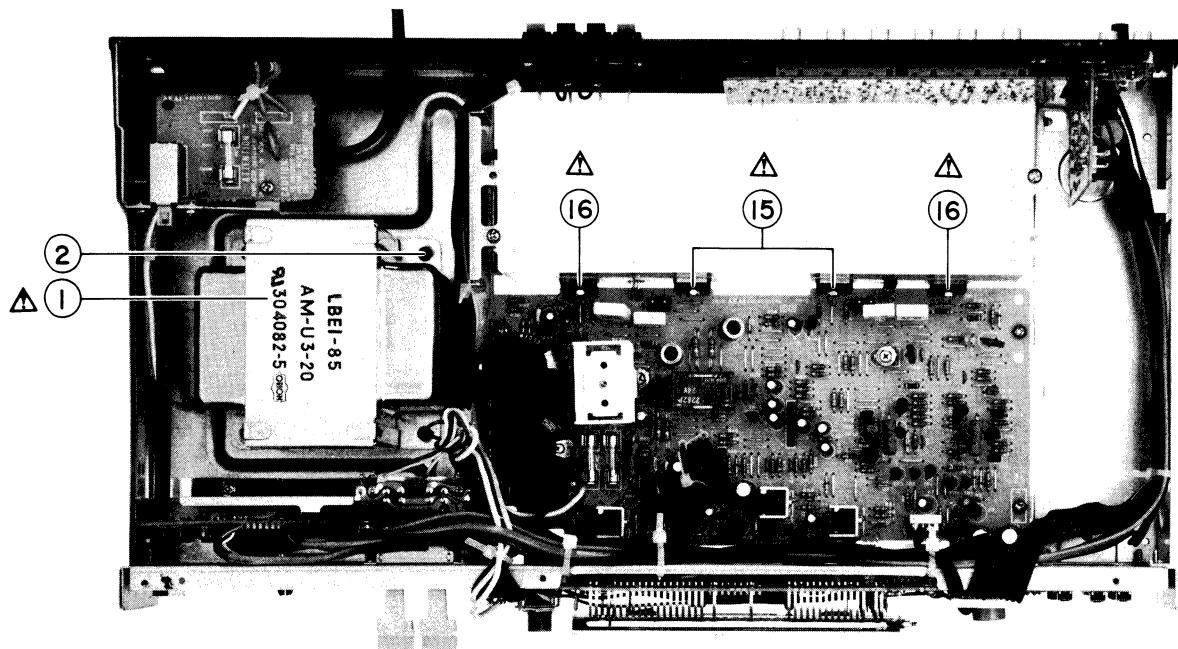
3. POWER SUPPLY P.C BOARD BLOCK (E,V,B,S)

REF. NO.	PARTS NO.	DESCRIPTION
3-SW1	ES-337902	△ SW PUSH SDLD1P 01-1
3-L1	EO-338409	△ COIL LF FKOB160MH02 250UH (V ONLY)
3-C1	EC-338411	△ C CE V FZ 103P 400AC
3-F1	EF-623125	△ FUSE SEMKO T 250V 2.50A

4. FILTER P.C BOARD BLOCK (V ONLY)

REF. NO.	PARTS NO.	DESCRIPTION
4-L1	EO-342936	COIL BALUM
4-TM1	EJ-343378	TERMINAL PUSH SQ-2783#90 P 8P

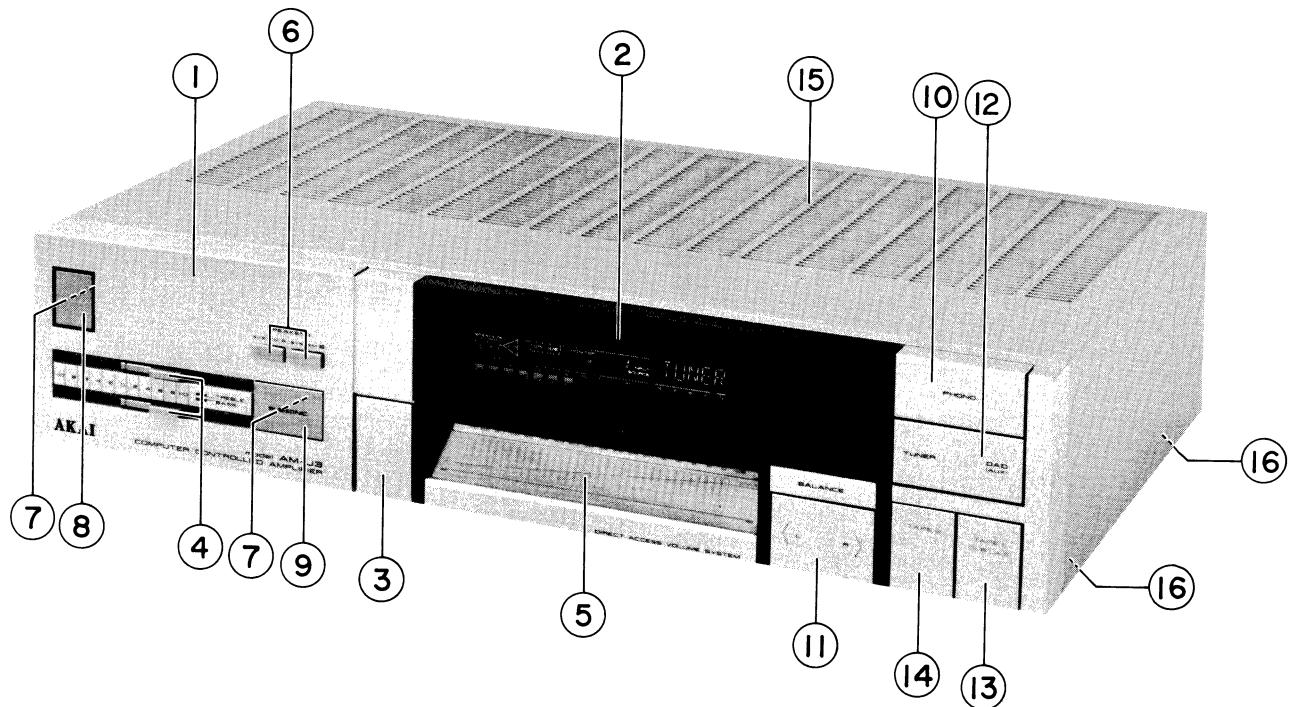
ASSEMBLY BLOCK



5. ASSEMBLY BLOCK

REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
ASSEMBLY BLOCK					
5-1U	BT-348526	△ TRANS POWER AM-U3-70 (U) (T901)	5-8A	EW-305691	△ AC CORD 2 CORES KP-8, SPT-1 UC (A)
5-1C	BT-348527	△ TRANS POWER AM-U3-30 (C) (T901)	5-8E	EW-346251	△ AC CORD 2 CORES VM0364, NR N/815 EV (E, V)
5-1A	BT-348528	△ TRANS POWER AM-U3-20 (A) (T901)	5-8B	EW-346249	△ AC CORD 2 CORES LCFL2x0.75 B (B)
5-1E	BT-348529	△ TRANS POWER AM-U3-40 (E, V) (T901)	5-8S	EW-336924	△ AC CORD 2 CORES KP-560, LTSA-2 FS (S)
5-1B	BT-348530	△ TRANS POWER AM-U3-50 (B, S) (T901)	5-9	EZ-631945	STRAIN RELIEF SR-4N-4
5-2	ZS-345624	ST PAN40x08STL CMT CUP	5-10	EJ-329610	TERMINAL W/SCREW UB-0067 1 P (TM902)
5-3	ZS-308846	T20BR30x08STL BZN PROJECTION	5-11	ZS-463353	T2BR30x08STL BNI
5-4	SA-332850	ROUND FOOT	5-12	EJ-343389	TERMINAL PUSH S-Q2780#90 S8P (TM901) (EXCEPT V)
5-5x	ZS-462925	T2BR40x08STL CMT (FOR FOOT)	5-13	EJ-337405	△ SOCKET OUTLET S2T733T164 JUC 3x2P (J901) (U, C, A)
5-6	ZW-305013	RV POP32 (A)	5-14x	ES-346123	△ SW SELECTOR 0240#13 01-4 (SW901) (U)
5-7U	SP-345449A	PANEL REAR AM-U3(U)	HEAT SINK BLOCK		
5-7C	SP-345449B	PANEL REAR AM-U3(C, A)	5-15	ET-345457	△ TR 2SD1046 D, E (TR10)
5-7E	SP-345449C	PANEL REAR AM-U3(E, V)	5-16	ET-345458	△ TR 2SB816 D, E (TR11)
5-7B	SP-345449D	PANEL REAR AM-U3(B, S)			
5-8U	EW-374894	△ AC CORD 2 CORES VM-0129A, VFF U/T (U)			
5-8C	EW-343363	△ AC CORD 2 CORES KP-8, SPT-2 105C UC (C)			

FINAL ASSEMBLY BLOCK



6. FINAL ASSEMBLY BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
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6-1 BD-A2022A020A PANEL FRONT BLK AM-U3
 6-1P BD-A2022A020B PANEL FRONT BLK AM-U3-P

PANEL FRONT BLOCK

6-2 SE-345106 WINDOW METER
 6-3 SP-343021A PANEL DOOR
 6-3P SP-343021B PANEL DOOR-P
 6-4 SK-345437A KNOB SLIDE
 6-4P SK-345437B KNOB SLIDE-P

FINAL ASSEMBLY BLOCK

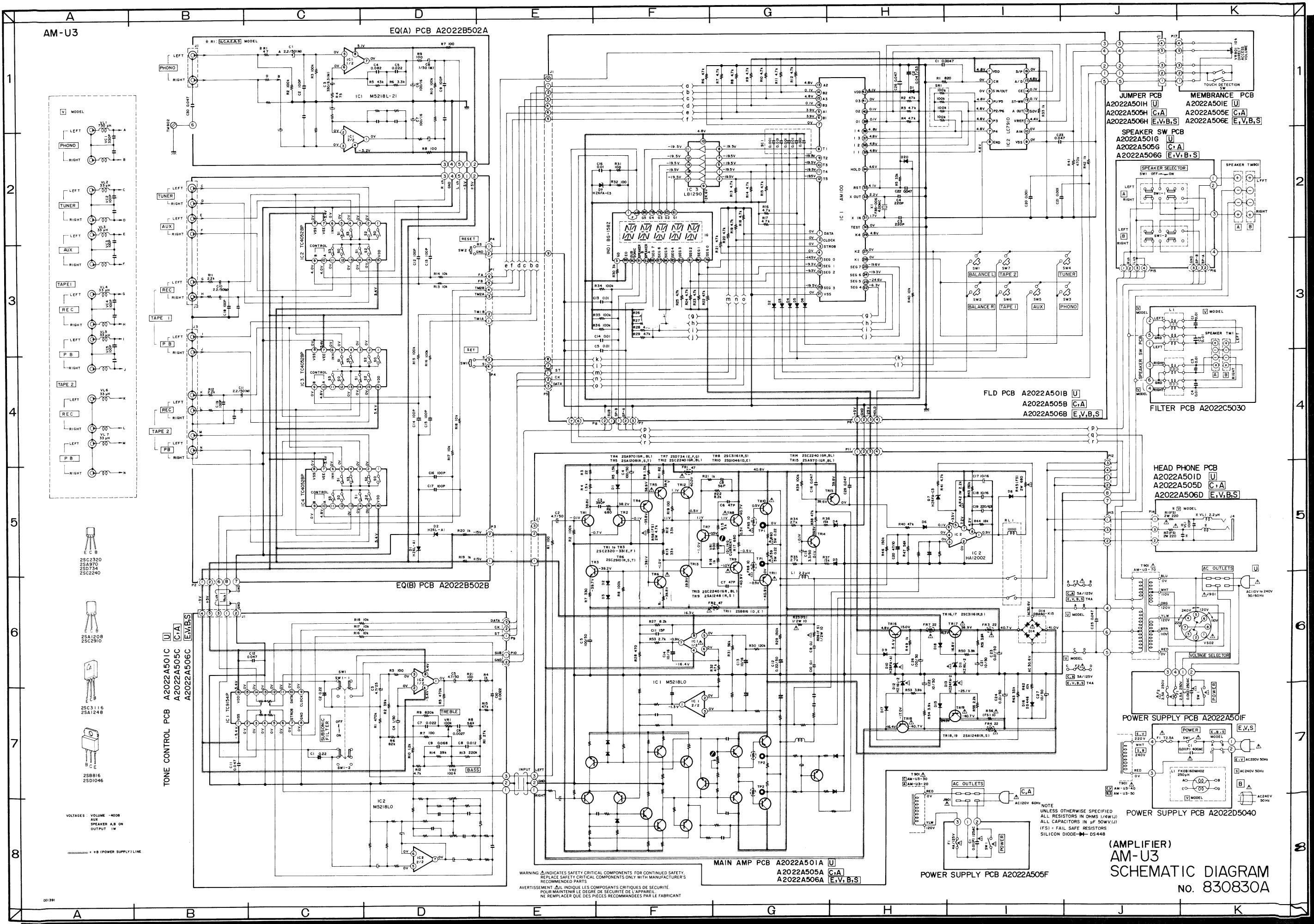
6-5	EV-345429	VR TOUCH SENSOR B10K(VR901)
6-6	SK-345439A	KNOB (A)
6-6P	SK-345439B	KNOB (A)-P
6-7	ZG-322579	SP (A)
6-8	SK-342820D	KNOB POWER (3)
6-8P	SK-342820C	KNOB POWER-P (2)
6-9	SK-345440A	KNOB (C) SUBSONIC
6-9P	SK-345440B	KNOB (C)-P SUBSONIC
6-10	SK-345443A	KNOB (E) PHONO
6-10P	SK-345443B	KNOB (E)-P PHONO
6-11	SK-345441A	KNOB (D) L/R
6-11P	SK-345441B	KNOB (D)-P L/R
6-12	SK-345444A	KNOB (F) TUNER/DAD
6-12P	SK-345444B	KNOB (F)-P TUNER/DAD
6-13	SK-345445A	KNOB (G) TAPE1
6-13P	SK-345445B	KNOB (G)-P TAPE1
6-14	SK-345445C	KNOB (H) TAPE2
6-14P	SK-345445D	KNOB (H)-P TAPE2
6-15	SP-345454A	COVER UPPER
6-15P	SP-345454B	COVER UPPER
6-16	ZS-308846	T2BR30x08STL BZN PROJECTION

SYMBOL FOR COLOR VARIATION

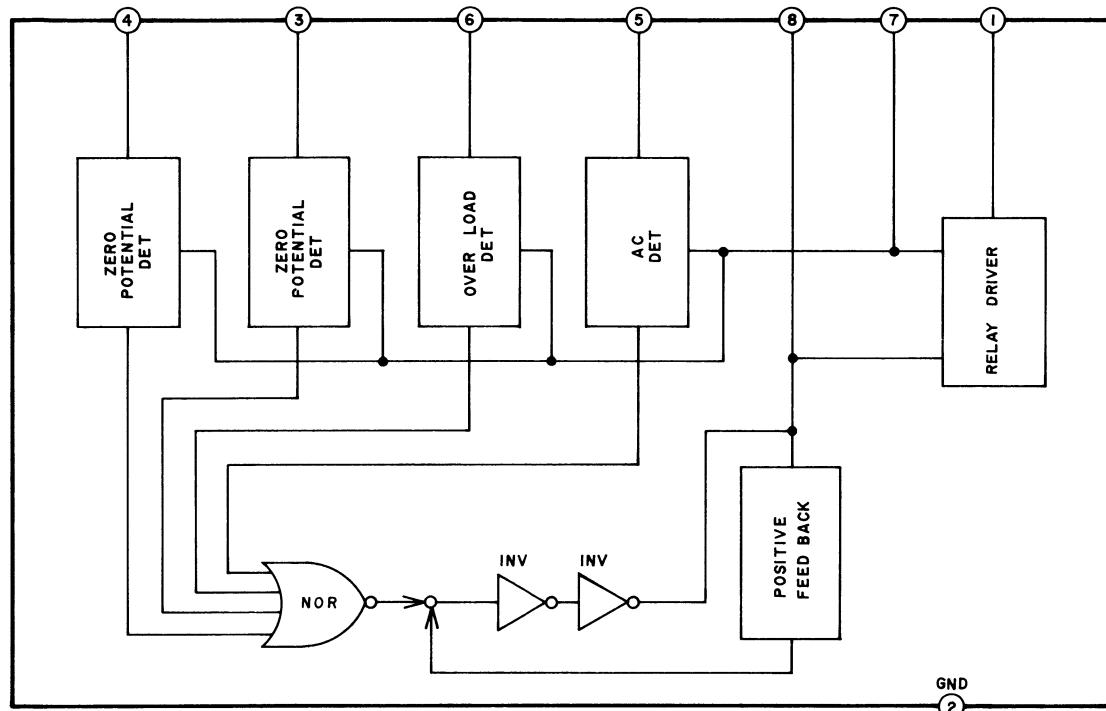
NONE – SILVER
 P – PEARL SHADOW

INDEX

PARTS NO.	REF. NO.	PARTS NO.	REF. NO.	PARTS NO.	REF. NO.	PARTS NO.	REF. NO.
BA-A2022A040A	2-1U	EJ-343395	1-J4D	EZ-631945	5-9		
BA-A2022A040B	2-1V	EJ-343396	1-J4DP	SA-332850	5-4		
BA-A2022A050A	1-1U	EJ-345468	2-J2B	SE-345106	6-2		
BA-A2022A050B	1-1C	EJ-345468	2-J3B	SK-342820C	6-8P		
BA-A2022A050C	1-1E	EJ-345469	2-J1A	SK-342820D	6-8		
BA-A2022A050D	1-1V	EM-345480	1-IND1B	SK-345437A	6-4		
BA-A2022A050E	1-1UP	EO-330256	1-X1B	SK-345437B	6-4P		
BA-A2022A050F	1-1CP	EO-336934	1-VL1D	SK-345439A	6-6		
BA-A2022A050G	1-1EP	EO-337684	2-VL1A	SK-345439B	6-6P		
BA-A2022A050H	1-1VP	EO-337880	1-L1A	SK-345440A	6-9		
BD-A2022A020A	6-1	EO-338409	3-L1	SK-345440B	6-9P		
BD-A2022A020B	6-1P	EO-342936	4-L1	SK-345441A	6-11		
BT-348526	5-1U	EO-345920	2-VL2B	SK-345441B	6-11P		
BT-348527	5-1C	EO-345920	2-VL3B	SK-345443A	6-10		
BT-348528	5-1A	EO-345920	2-VL4B	SK-345443B	6-10P		
BT-348529	5-1E	EO-345920	2-VL5B	SK-345444A	6-12		
BT-348530	5-1B	EO-345920	2-VL6B	SK-345444B	6-12P		
EC-200949	1-C20A	EO-345920	2-VL7B	SK-345445A	6-13		
EC-300193	1-C13A	EQ-337159	1-RL1A	SK-345445B	6-13P		
EC-300193	1-C14A	ER-308875	1-R25A	SK-345445C	6-14		
EC-314688	1-C1FC	ER-308875	1-R26A	SK-345445D	6-14P		
EC-315764	1-VC1D	ER-318248	1-FR1A	SP-343021A	6-3		
EC-320548	1-C1FU	ER-318248	1-FR2A	SP-343021B	6-3P		
EC-338411	3-C1	ER-319455	1-FR5A	SP-345449A	5-7U		
EC-343855	1-C1C	ER-319455	1-FR6A	SP-345449B	5-7C		
EC-343855	1-C2C	ER-322787	1-R56A	SP-345449C	5-7E		
EC-343855	1-C12A	ER-326169	1-FR3A	SP-345449D	5-7B		
EC-344157	1-C2B	ER-326169	1-FR4A	SP-345454A	6-15		
EC-346822	1-SC1B	ER-326169	1-FR7A	SP-345454B	6-15P		
ED-200749	1-D14A	ER-343420	1-SR1B	ZG-322579	6-7		
ED-301911	1-D5A	ER-345466	1-R60A	ZS-308846	5-3		
ED-301911	1-D6A	ER-345466	1-R59A	ZS-308846	6-16		
ED-301911	1-D8A	ER-345508	1-R58A	ZS-345624	5-2		
ED-301911	1-D9A	ER-349039	1-R45A	ZS-462925	5-5x		
ED-301911	1-D1B	ER-539087	1-R42A	ZS-463353	5-11		
ED-301911	1-D2B	ER-658034	1-R1D	ZW-305013	5-6		
ED-301911	1-D3B	ER-658034	1-R2D				
ED-301911	1-D4B	ES-336780	1-SW1B				
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ED-301911	1-D6B	ES-336780	1-SW3B				
ED-301911	1-D20B	ES-336780	1-SW4B				
ED-301911	1-D15A	ES-336780	1-SW5B				
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ED-301911	1-D17A	ES-336780	1-SW7B				
ED-301911	1-D1A	ES-337902	1-SW1F				
ED-301911	1-D2A	ES-337902	3-SW1				
ED-301911	1-D3A	ES-345470	2-SW2B				
ED-301911	1-D4A	ES-345470	2-SW1B				
ED-337153	1-D7A	ES-345476	1-SW1G				
ED-337153	1-D16A	ES-345481	1-SW1C				
ED-343410	2-D1B	ES-346123	5-14x				
ED-343410	2-D2B	ET-305463	1-TR15A				
ED-343421	1-D11A	ET-305463	1-TR4A				
ED-343421	1-D12A	ET-307195	1-TR12A				
ED-346447	1-D10A	ET-307195	1-TR13A				
ED-346454	1-D7B	ET-307195	1-TR14A				
ED-346509	1-D13A	ET-328578	1-TR1A				
EF-306951	1-F1U	ET-328578	1-TR2A				
EF-306951	1-F2U	ET-328578	1-TR3A				
EF-306957	1-F1C	ET-345457	5-15				
EF-346139	1-F2C	ET-345458	5-16				
EF-346139	1-F3C	ET-345460	1-TR5A				
EF-623125	3-F1	ET-345461	1-TR6A				
EF-690996	1-F2E	ET-345462	1-TR7A				
EF-690996	1-F3E	ET-345463	1-TR8A				
EI-332259	2-IC2B	ET-345463	1-TR16A				
EI-332259	2-IC3B	ET-345463	1-TR17A				
EI-332259	2-IC4B	ET-345465	1-TR9A				
EI-337013	1-IC3B	ET-345465	1-TR18A				
EI-337228	1-IC1A	ET-345465	1-TR19A				
EI-337228	1-IC2C	EV-345429	6-5				
EI-343371	1-IC1C	EV-345482	1-VR1C				
EI-345474	1-IC2A	EV-345482	1-VR2C				
EI-345478	1-IC1B	EV-345780	1-VR1A				
EI-345479	1-IC2B	EW-305691	5-8A				
EI-346071	2-IC1A	EW-336924	5-8S				
EJ-329610	5-10	EW-343363	5-8C				
EJ-337405	5-13	EW-346249	5-8B				
EJ-343378	4-TM1	EW-346251	5-8E				
EJ-343389	5-12	EW-374894	5-8U				



HA12002



SECTION 3

SCHEMATIC DIAGRAM

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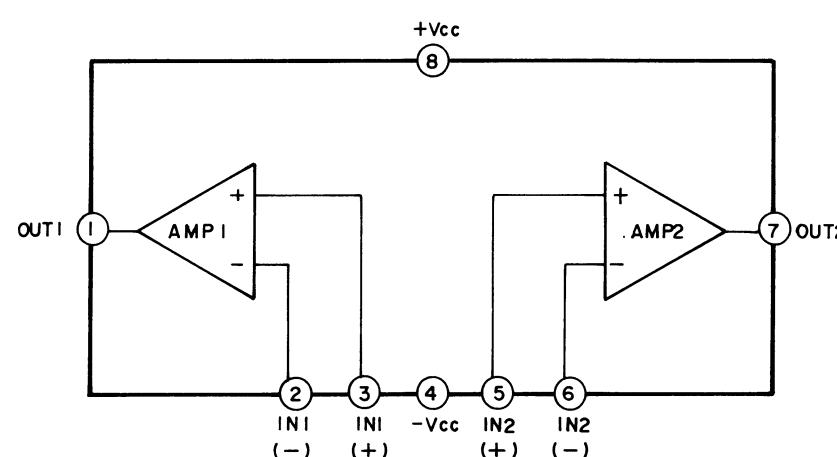


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